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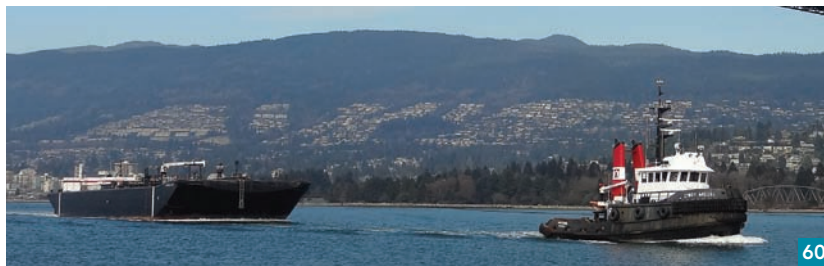
Western Mariner®

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CANADA'S COMMERCIAL MARINE MAGAZINE

APRIL 2015 ► VOLUME 13 ► NUMBER 2

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PHOTO COURTESY CANADIAN COAST GUARD



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APRIL 2015 VOLUME 13 NUMBER 2



FROM THE EDITOR'S DESK

Rob Morris

Chinese-built Barges and a Tug

In the early 2000s, Island Tug and Barge and Seaspan International had hulls for new towboats built in the Jinling shipyard in China. The SEASpan VENTURE, SEASpan TEMPEST and ISLAND SCOUT were designed by BC naval architects and were completely outfitted and launched in Vancouver. Then there were five Robert Allan Ltd (Vancouver)-designed tugs completed by shipyards offshore (outside of Canada). In 2009 Seaspan took delivery of the terminal/escort tug SEASpan RESOLUTION from the Martinac shipyard in Seattle. It was followed a couple of years later by the sister shipdocking tugs SEASpan RAVEN, SEASpan EAGLE, SEASpan KESTREL and SEASpan OSPREY from the Sanmar Denizcilik shipyard in Turkey.

Arriving in Vancouver recently as deck cargo on one of their new Chinese-built barges, was Ledcor Marine's new towboat, STORM TITAN (see *Meridian Marine Industries in In the Shipyards* in this issue). This newbuild has a different wrinkle to it, in that it was both designed (by Damen, Holland) and built (by Damen Shipyards Changde, China) offshore. Off the top of our head, we can only recall one other tug delivered to a BC company that was both designed and built offshore - the SMIT ORLEANS was originally built as the TP 3 by Nichols Brothers Boatbuilders in Washington State to a Jensen Maritime Design (Seattle) for Minette Bay Ship Docking (Prince Rupert). Before we venture any further out on this limb, perhaps readers will let us know if there are any other tugs that were designed and newly-built for BC companies by offshore shipyards.

Back in the late 1990s both Seaspan and Rivtow Marine had chip barges built in China. That was the beginning of a sporadic but substantial flow of Chinese-built barges over the years since. Barges of all types have arrived in Vancouver on heavy-lift ships or towed by tugs: wood products, deck cargo, split hoppers, petroleum products and truck trailer/rail car. Ledcor's heavy-duty deck cargo barges are the latest (see *In the Shipyards*) and the arrival of both Ledcor and Tymac Launch Service (see *Waterfront: Burrard Inlet* in this issue) barges was imminent as this issue went to press. And more Chinese barges are about to come over the horizon.

The old IVANHOE reportedly was broken up quite easily and quickly by a pair of excavators at Arrow Marine (see *In the Shipyards*). This suggests the tug's overall structure was deteriorated and weakened. Hearing awhile back that some sort of vinyl sheeting had been laid on the planked decks to try and stop fresh water ingress was not a good sign. Then the big tug was damaged when it fell on its side in a drydock in Anacortes WA about two years ago. Demolition on land is an abrupt and sad way to go but it seems the time had come for the 107-year-old Arthur Moscrop-built (at Wallace Shipyards, North Vancouver) classic towboat. ◀



FROM THE PUBLISHER'S DESK

David Rahn

Mari-Tech 2015

This month, we welcome marine engineers and associated engineering and naval architecture businesses visiting Vancouver from across the country to attend Mari-Tech 2015. The technical conference and trade show, presented annually by the Canadian Institute of Marine Engineering, is being hosted this year by the Vancouver Branch, at the Hyatt Regency hotel. Readers will find the complete Program Guide included in this issue; and please note, non-members are most welcome to attend. For those who do, we'll see you there April 8 to 10. ◀

PHOTO BY CAROLYN MATT



ISLAND TRADER & ISLAND MONARCH

Carolyn Matt, safety administrator at ITB Marine Group, sent this photo she took in late November of the ISLAND TRADER with the pusher tug ISLAND MONARCH in the notch. "They are a beautiful couple," she adds, and we agree.

PHOTO BY BARB HOWE



Boom Boats – MISS PIGGY

To the Editor:

The "Mini-boom in boom-boats" in *From the Editor's Desk* in the February issue was a delightful read. The piece on the recent proliferation of sidewinders

(page 22, same issue) was a great addendum to Lea Edgar's article "A short history of boom boats" that appeared in *BC Shipping News* (December 2013/2014). It's good to hear familiar names in BC ship-building that are part of the history of these little "pushy with attitude" vessels.

Here is a picture of MISS PIGGY celebrating her 61st birthday last year. The bronze plaque she carries identifies April 13, 1953 as the day she officially became hull serial number 40658, built by S. Madill in Nanaimo.

MISS PIGGY was purchased in January 2014 from S. McKenzie Contracting Ltd. in Revelstoke where she had been up on blocks for several years. No sur-

prise though, that after some tinkering the 4-53 Detroit Diesel flashed up and she began her new life in Annacis Channel. MISS PIGGY is owned by our gentle consortium of friends, and is on light duties at Queensgate Marina, a float home community in Queensborough.

Unfortunately MISS PIGGY can only tell us by her condition that she has been very well taken care of over many years - and her pushy attitude is still very much intact. Perhaps some WM readers can tell us more about the history of these 15-ft x 7-ft dozer boats built by S. Madill in the 1950s.

Kind regards,

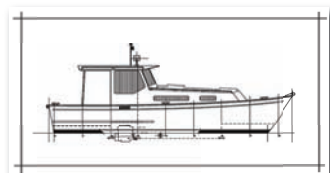
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LETTERS

Bells and Jingles

To the Editor:

When I worked on the Gilley Bros tugboats in the early 1950s, they used a system of communication between wheelhouse and engine room with two different tones of bells. Are there any ancient mariners out there that can refresh my memory on the combinations of "bells and jingles" that were used to request the different engine speeds?

*Thank you,
Glen Olson*

Qualicum Beach BC

*Editor's note: Readers can please contact
Glen Olson through Western Mariner.*

New Observers Welcome at the Cetacean Sightings Network

To the Publisher:

The British Columbia Cetacean Sightings Network (BCCSN) is a Vancouver Aquarium conservation and research program that collects sightings of cetaceans and sea turtles and uses that

data to better understand the occurrence, distribution and densities of cetacean and sea turtle populations throughout BC. Through our own analysis and through sharing it with other agencies and organizations (BCCSN has operated in collaboration with Fisheries & Oceans Canada since 2000) this information helps us better pinpoint areas of important habitat and acute threats. This information in turn guides threat abatement and mitigation. On top of collecting data, the BCCSN aims to inform and educate coastal British Columbians about the cetaceans and sea turtles that inhabit our coast, as well as promote stewardship activities that will mitigate threats to these species at risk.

We currently have a diverse network of 4,000 observers, ranging from interested citizens to lighthouse keepers, ecotourism professionals, mariners and recreational boaters. Anyone can participate and reports are made via an on-line form at www.wildwhales.org, our toll-

free number 1 866 I SAW ONE (472-9663), email sightings@vanaqua.org, or via logbook supplied on request. A smartphone app will be released shortly.

To date we have collected nearly 75,000 sighting reports from the coast of British Columbia and adjacent offshore waters. These include reports on 23 cetacean species and three species of turtles, 12 of which are listed as 'at risk' under the *Canadian Species at Risk Act*.

We welcome new observers and hope some of your readers may be interested in learning more and participating.

Best regards,

Caitlin Birdsall

Coordinator, BC Cetacean

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satellite office

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A LETTER FROM HOME

Not so junky after all

Dear Friends,

I have a lot of time on my hands now that I seem to be moving from semi-retirement (I didn't go herring-roe fishing this season) to retirement. So I find myself doing all sorts of strange things. My partner in our old troller is a "clean freak" so we used a wet vacuum to get our bilge absolutely dry. Poking around in the engine compartment we saw something odd. Previously it was a more or less a watertight bulkhead but we found two small holes on either side of the shaft log. Limber holes said my partner. What the hell were these holes for?

The explanation is simple: they allowed water in the engine area to flow back into what was formerly the fish hold. This meant only one bilge pump was necessary. Ingenious. And they have a long history, as I found out. My research led me down a strange path ending with the Chinese junk. The Chinese junk is a strange ship that has long intrigued naval historians. First, it is not called a junk because of its supposedly junky appearance. The name comes from a Javanese word for ship that's pronounced close to "junk". The name is not important but the design of the ship is. Equally weird is the sail plan. More on that later. The ship itself has fitted planks rabbeted together and the seams caulked. A notable feature were the many watertight bulkheads providing strength and the ability to separate cargo. Limber holes had a role to play here. Limber holes are just small holes drilled into the bulkhead.

The various holds could be kept watertight if the limber holes were stopped up. If opened, water could flow to the lowest part of the ship where it could be pumped out. Only one pump was then necessary, much as in our vessel (actually we now also have an automatic engine room bilge pump). Amazingly, the old-time junks were huge, up to 300 feet long, it was said, so there must have been many compartments and many limber holes. Was there a guy in charge of them? Hard to say as not much is known about how the junks were actually operated. What is known is that there were lots of them and they made some incredible voyages. In the 15th century they travelled as far as the Indian Ocean but later imperial policy was to stop any further Chinese exploration.

The junk had two great attributes, it was among the first designs to have a rudder, making steering easier, and it had its

unique battened sails. You've heard of batten down the hatches and you can also batten down sails. The Chinese junk did exactly that. The sail acted like a large Venetian blind that could be raised and lowered easily. This certainly required different methods of sail management and I am no expert on this stuff. But I did wonder how they pumped out the bilges.

We have 12-volt automatic pumps, how did they do it? I don't really know but here is how it was done in the old days on small gillnetters. I'm talking Easthope engine-era here. Inserted into the fish hold through the deck was a square cedar box about six inches wide. Inside it was small cedar pole that had a rudimentary valve that allowed the water to be forced up and overboard on the upstroke. The valve, if it can be called that, was a piece of hard rubber on the end of the small pole (effectively the pump handle) that flexed upwards on the downstroke, allowing water to fill the pump box, and was rigid on the upstroke forcing water overboard. Hard to describe but eminently simple and efficient. In the 1940s and '50s they were standard on small gillnetters. I have no idea how the Chinese did it but it could be similar. Ancient records always talk about mariners manning the pumps but no one ever describes what they looked like or how they operated.

We are suitably limber-holed and bilge-pumped. In the little hatch in the stern where the steering gear is we have a small plastic pipe that acts as a limber-hole draining the water into the little hatch where the stuffing box is. It is fitted with a small bilge pump. This hatch is limber-holed into the engine room bilge where there is a larger bilge pump. Both pumps are automatic and wired into a control panel that lights up when they are operating. You might say it is a robust system and it is. We are over-prepared as our little boat hardly leaks at all. But we are ready.

I once had a bad experience with a leaky boat and a small bilge pump. The pump was wired to a 12-volt battery but the battery went dead, the pump stopped and the boat sank. Ouch! But we have shore power and no worries. Like the Chinese junks we are happy with our limber holes. Not at all junky. ◀

Mrs. Amor de Cosmas

PROPULSION



PHOTO COURTESY CANADIAN COAST GUARD

Main propulsion in the CCGS CAPTAIN GODDARD M.S.M. and the CCGS M. CHARLES M.B. is twin 2496 kW (3350 hp) MTU 12V4000 M9 3L diesels turning Rolls-Royce/KaMeWa 55A/4D-B controllible pitch propellers through Lufkin HSQ17.72HGL gearboxes. Top speed is 25 knots, cruising speed is 14 knots.

CCGS CAPTAIN GODDARD M.S.M. & CCGS M. CHARLES M.B.

Coast Guard's New Mid Shore Patrol Vessels Arrive on West Coast

On Monday, February 23, 2015 the Canadian Coast Guard/Fisheries and Oceans Canada (CCG/DFO) Pacific Region held a welcoming ceremony for the two new 'Hero' class Mid-shore Patrol Vessels (MSPV) at the Institute of Ocean Sciences in Sidney BC. The CCGS CAPTAIN GODDARD M.S.M. and the CCGS M. CHARLES M.B. departed from Halifax NS, on January 11, 2015 and arrived in Victoria BC on February 19.

After their sea trials the MSPVs will be deployed on a multi-tasked full-time basis, starting in late March/early April, to patrol BC's South and North Coasts for DFO Conservation and Protection's new Pacific Region Marine Patrol Program and to provide SAR (search and rescue) marine response coverage on the BC coast.

The MSPV is based on the Damen (Holland) Stan Patrol 4207 design. Currently vessels of the same design are being

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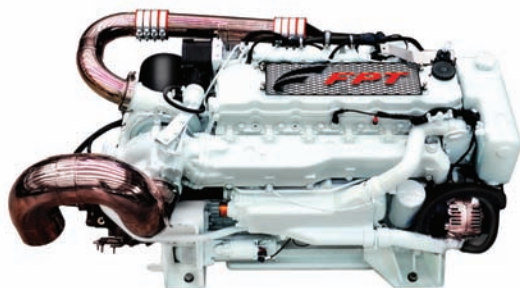
The CCGS CAPTAIN GODDARD M.S.M. (right) and the CCGS M. CHARLES M.B. were delivered by Halifax Shipyards to the CCG in October and June 2014, respectively. They are shown in this photo at their welcoming ceremony at the CCG/DFO base in Patricia Bay BC.

used by agencies such as the UK Border Agency and the Coast Guards of the Netherlands, Barbados, Jamaica and Albania, and now the CCG. The Damen Stan Patrol 4708, a modification of the 4207, is being used by the US Coast Guard for more than 35 Fast Response Cutters currently under construction in Louisiana. The 'Mid-Shore' designation means the vessels can operate up to 120 nm offshore. They have the capability to

communicate securely with other Canadian government vessels and national classified command and control networks.

The MSPV acquisition project is the first of several major projects to be undertaken as part of the CCG's long-term Fleet Renewal initiative. In August 2009, a \$194 million contract was awarded to Irving Shipbuilding Inc. for the construction of nine MSPVs at their Halifax Shipyards. The CCGS CAPTAIN

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Capt. Joanne McNish, CCG Regional Director Fleet, Western Region (front left) with Capt. Jeff Nemrava (front centre) and Chief Engineer Tyler Twordik (front right) and members of the delivery crew of the CCGS M. CHARLES M.B. Capt. Nemrava was the CCG Western Region Project Manager/Commanding Officer responsible for taking delivery of both vessels from the shipyard and completing outfitting, post-delivery trials and preparations for delivery to the West Coast.

GODDARD M.S.M. and CCGS M. CHARLES M.B. were vessels eight and nine in the contract and are replacing four existing CCG/DFO vessels on this coast – the ATLIN POST, the ARROW POST, the SOOKE POST and the KITIMAT II.

The nine MSPVs are designated as the 'Hero' class because they are named in memory of fallen Canadian heroes. The CCGS M. CHARLES M.B. is named after Seaman Martin Charles, S.C., M.B., of Bamfield BC, a hereditary chief of the Nitinat Band who devoted his life and career to saving lives, for which he received the Medal of Bravery. The CCGS CAPTAIN GODDARD M.S.M. is named after Capt. Nichola Kathleen Sarah Goddard, M.S.M., who was awarded the Meritorious Service Medal for her exemplary service in Afghanistan from January 2006 until her death in combat in May 2006. *By Rob Morris* ◀

PHOTOS COURTESY CANADIAN COAST GUARD



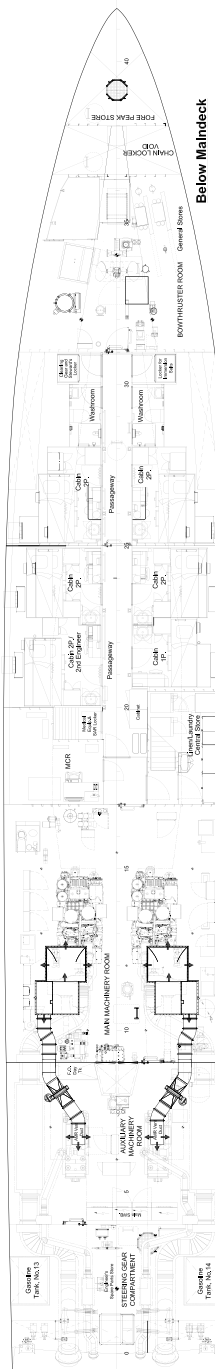
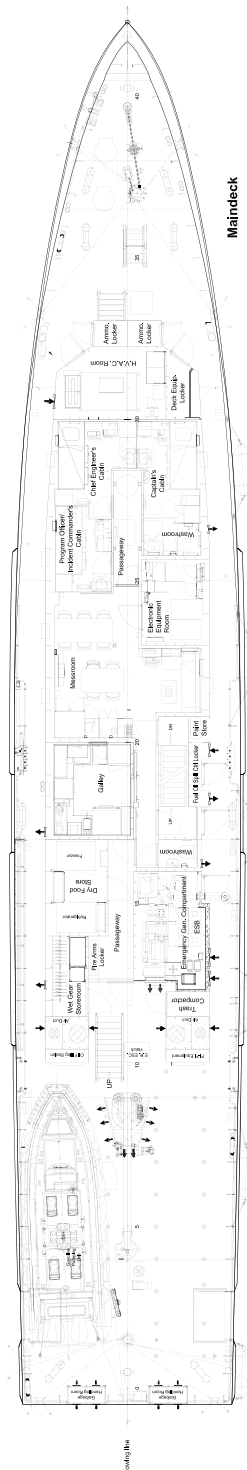
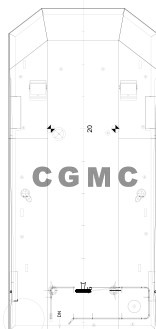
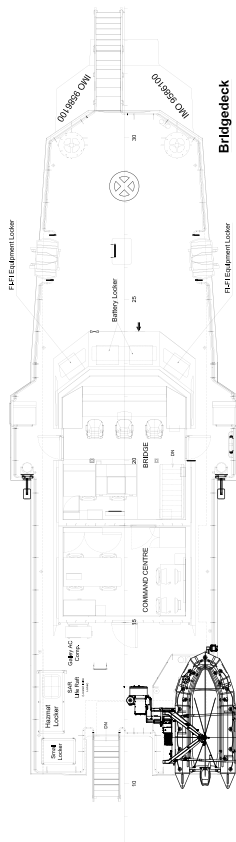
Capt. Joanne McNish, CCG Regional Director Fleet, Western Region (left) with Capt. Bob Bennett (centre) and Chief Engineer Matt Jackson (right) and members of the delivery crew from the CAPTAIN GODDARD M.S.M.

PHOTO COURTESY CANADIAN COAST GUARD



Characteristics of the Mid-Shore Patrol Vessel

| | |
|-------------------------------------------|------------------------------------------------------------------------------------|
| Parent Design: | Damen Stan Patrol 4207 |
| Classification: | Lloyds' Register |
| Builder: | Irving Shipbuilding Inc |
| Length: | 43 m (141 ft) |
| Beam: | 7.0 m (23 ft) |
| Draft: | 2.85 m (9.3 ft) |
| Displacement: | 257 tonnes (estimate) |
| Maximum speed: | 25 knots |
| Cruising speed: | 14 knots |
| Range at 14 knots: | 2,000 nautical miles |
| Endurance: | 14 days |
| Propellers: | two controllable pitch |
| Power: | 4,992 kW |
| 7.53m Rigid Hull Inflatable Boats (RHIB): | 1 for Conservation and Enforcement variant and 2 for the Maritime Security variant |
| Crew: | 14 (CCG, RCMP and DFO Conservation & Enforcement) |
| Material: | steel hull, aluminum superstructure |



MAIN DIMENSIONS:

| | |
|-------------------------------------|----------|
| Length Moulded | 42,800 m |
| Beam Moulded | 7,000 m |
| Max. Air Draught | 16,320 m |
| Extreme Appendage, | 2,796 m |
| Draught Alt at Marks | 2,218 m |
| Draught Alt at Marks | 3,910 m |
| Load Line Draft | 3,771 m |
| Depth at Centreline (Fr.14) | 3,771 m |
| Depth at Side (Fr.14) | 3,771 m |
| Least Moulded Depth at Side (Fr.14) | 1,000 m |
| Frame Spacing (s) | 14 |
| Crew | |

CLASS:

Lloyd's Register (LR) *100A1, Special Service Craft (SSC), High Speed Craft (HSC), Patrol Vessel (Patrol), Service Group 4 (G4), Unattended Machinery Space (UMS), Environmental Protection (EP), Propulsion Steering Machinery Redundancy (PSMR), Centralized Control Station (CCS), Integrated Computer Control (ICC).

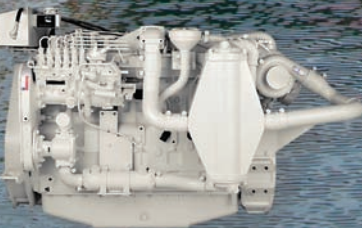
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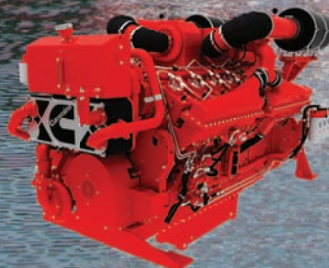


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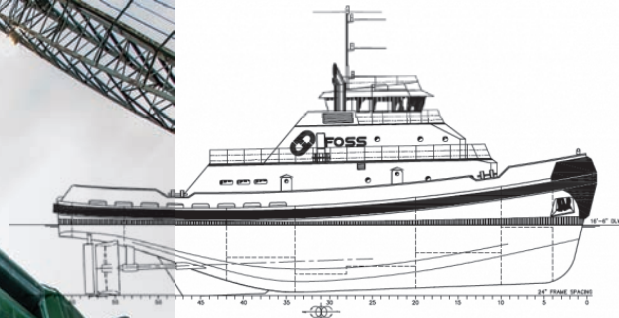
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PROPULSION



The Nautican Integrated Propulsion Units installed on Foss Maritime's first Arctic-class tug, the MICHELE FOSS. The design of the Arctic-class tug (inset graphic) is based on Foss in-house design concepts, with detailed design by Glosten Associates (Seattle). The Arctic class meets ABS A1 and Ice Class requirements.


Nautican Integrated Propulsion Units for Foss Arctic-class Tugs

BY PETER MARSH

Foss Maritime has designed and is building three Arctic-class towboats capable of operating safely and ecologically while moving oil-exploration cargoes in the demanding waters of Alaska's North Slope. The large tugs are 132' loa x 41' x 18' (maximum draft) and are powered by twin 3,634-hp (@ 900 rpm) Caterpillar C280-8 Tier 2 diesels. They have many

features to ensure they will meet the highest environmental standards and are expected to achieve well in excess of 100 metric tons of bollard pull. The tugs are being built at the Foss Shipyard on the Columbia River at Rainier OR.

The stern gear is of particular importance since it must be capable of withstanding occasional shallow water groundings



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Propulsion

and broken ice, along with manoeuvring barges and drilling rigs in difficult weather conditions. To handle such challenges Foss selected Nautican Research and Development's (Vancouver) Integrated Propulsion Unit (IPU). The IPU combines the Nautican High Efficiency nozzle with a Nautican ice-class propeller and Nautican Triple Rudder.

The Nautican High Efficiency Nozzle was the first product released by the then-named NautiCAN Research and Development which was founded in North Vancouver by Josip Gruzling. A professional engineer from Croatia, Gruzling began his Canadian career in 1968 working for Robert Allan Ltd (Vancouver) where he worked with Robert 'Bob' Allan on barge skeg design. In 1972 Gruzling established NautiCAN and did pioneering work in the application of hydrodynamics to increase the efficiency of nozzles, triple rudders, directional barge skegs and propellers. During his 35 years at the helm of NautiCAN Gruzling was awarded nine patents, and improved the performance and handling of hundreds of tugs and barges with his innovative products.

The Nautican Triple Rudder has three high aspect ratio foils



PHOTO BY HH CLICK PHOTOGRAPHY

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The size and form of the Nautican High Efficiency nozzles are evident in these photos. Also visible are the 126-in ice-class propellers and the stators which are angled to impart a counter-rotational flow to the water entering the propeller, thus increasing thrust.

or engine overloading. This, in turn, enables barge trains to make tight turns.

In 2003, Nautican Research and Development (the company's name today) developed the Integrated Propulsion Unit, a fully assembled unit ready to install. The first application was on a retrofit of Northern

for blades to generate higher lift forces with less drag. A foiled strut supports the three blades across their lower tips and also helps to damp pitching moments. It places the rudder well aft for more turning power and uses a differential linkage to direct the outflow up to 60 degrees to the sides without loss of thrust

Transportation's shallow-draft tug, EDGAR KOTOKAK, which works on the Mackenzie River. The unit was shown to reduce shipyard installation time and increase the accuracy of alignment and has since been installed on large tugs, ships and fishing vessels.

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For the Arctic class tugs, an IPU was engineered with a 126-in diameter propeller with three fixed blades and designed to handle first year ice. The propellers are the typical Nautican highly-skewed Kaplan style with heavy stainless steel blades designed to withstand the impact of ice. The heavy duty design and construction of the Nautican IPU meet all the ice class requirements with only one modification – the thickening of the leading and trailing edges of the propellers for ice impact resistance.

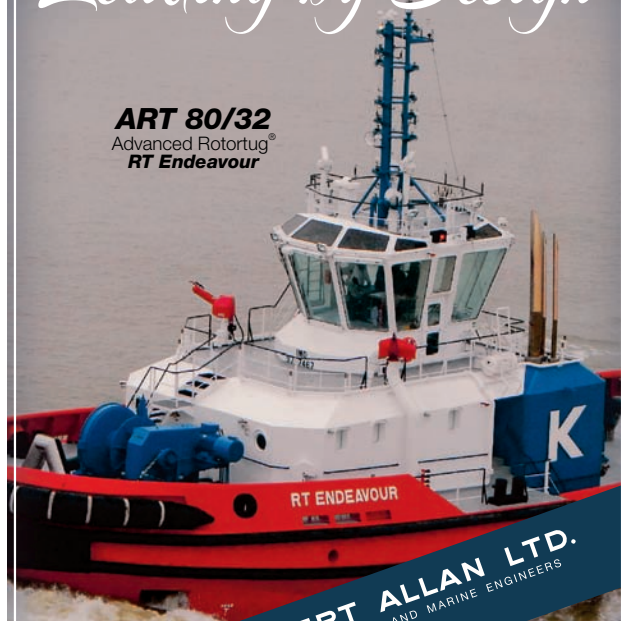
The pre-swirl stators forward of the propeller not only condition the flow leading into the propeller for improved efficiency, but also offer some protection to the propeller, helping to deflect debris and ice. Additionally, the heavy stators both stiffen the nozzle, making it far stronger than a conventional nozzle, and eliminate the need for support struts.

Joe Gruzling's daughter, Nicolle, who has a masters degree in computer science, worked with her father in his later years. When he died in 2007, she ran the company until 2013 when industry veteran Elizabeth Boyd purchased Nautican Research and Development. Under her leadership, the company has grown significantly and continues to dedicate itself to researching, developing and perfecting hydrodynamic solutions for the marine industry.

"The Foss Arctic tugs are powerful vessels that will be operating in demanding environments," said Boyd, who had worked with Foss previously as a naval architect and engineer.

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“The Nautican unit will offer increased bollard pull, and greater manoeuvring and efficiency through ice and rough sea conditions. We’re excited to see what the tugs will do once they are in service.” ◀

*Peter Marsh is a marine writer based in Astoria OR.
www.sea-to-summit.net*



PHOTO BY BRUCE SHERMAN

The MICHELE FOSS is heavily built to handle light ice conditions, with 1/2-in plating and closely-spaced frames in the bow section. The tug is also equipped with redundant systems and extra fuel capacity, in order to be self-sufficient during Arctic missions.



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NAME THIS SPOT

PHOTO BY ROB MORRIS



From the dozen-plus correct entries to the February '15 *Name This Spot* that of Fred Bullen of Nanaimo was drawn. His answer was Bella Bella on BC's Central Coast. The Heiltsuk people of the region call the village Waglisla which means, as one entrant informed us, 'river on the beach' in their language. Several entrants

noted that the band store (the large white building to left of the fuel tanks; also housed the post office, liquor store and Koeys Café) had burned down since the photo was taken (it was taken in July 2010; the store burned in July 2013) but that a new store was now in operation (with "an excellent food selection, by the way," noted one entrant). The large landing barge at the government wharf is the LASQUETI DAUGHTERS, built in 2001 by Peter Lironi of Lasqueti Island and now registered to Impact Reforestation of Campbell River BC. ◀



Each month Western Mariner will award a choice of a vest or hat to one reader who correctly identifies the location shown in the accompanying photograph.

Send your entries by fax, mail or email to: **Name this Spot, Editor, Western Mariner**
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Please include your name, address, vest/hat choice (include size for vest), daytime telephone number and email address. The winner will be announced in the issue two months after this one.



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PROPULSION



This Teekay Shipping LNG carrier, the 285m loa x 43.4m x 12.15m LOBITO, has tri-fuel electric propulsion (LNG, diesel or heavy fuel oil) and a 161,337 cubic metres cargo capacity. Built in 2011 by Samsung Heavy Industries, it is a membrane-type carrier versus a Moss (spherical) type. Of the almost 400 LNG carriers in active service, 75 percent are of the membrane design; and of the vessels on order or under construction, about 85 percent are of the membrane type. LNG carriers will be more frequently sighted on the BC coast as LNG shipping terminals are established.

Liquefied Natural Gas Marine Fuel Coming to the BC Coast

BY DAVID R. CONN

Stand by for vessels fueled by liquefied natural gas (LNG) to begin operating on the BC coast as soon as 2016. Natural gas is familiar as a piped domestic heating and cooking source, for power generation, and as fuel for heavy trucks in its compressed or liquefied form, and we've been hearing a lot about natural gas resources in northeast BC as the provincial government promotes exports to Asia.

A key global resource

Natural gas is mostly methane and is the cleanest-burning fossil fuel. It will be cleaner yet if emissions from drilling, processing and transport can be better controlled. Switching from burning coal and oil to natural gas reduces local air pollution. The gas has become abundant and affordable, especially in

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Brad Caldwell



FortisBC is expanding its LNG liquefaction plant and building a second storage tank at Tilbury Island in Delta.

facilities has terminals for ships – they rely on tanker trucks to deliver the fuel.

The provincial government has approved over a dozen proposals for more liquefaction plants and BC's first LNG export terminals. Most will be located around Prince Rupert and Kitimat. On the south coast, there is a proposal to build a plant and terminal at the former Woodfibre pulp mill in Howe Sound. Two terminals have also been approved for the Oregon coast. See *Western Ports and Terminals: LNG - A Project Overview of BC's Fuel for the Future in Western Mariner*,

North America. Pipelines work well for distribution, but liquefaction allows transport beyond pipelines, at the cost of more emissions. LNG is predicted to be a key global resource for at least the next 20 years. With emissions regulations becoming stricter, natural gas is gradually replacing coal and oil in many applications. If correctly priced it might serve as a "bridge" to a renewable energy future.

Liquefaction, storage and export

Liquefaction means using heat exchangers and compressors to chill natural gas to -162 degrees C, beyond the point where it becomes a liquid. This process reduces the volume by 600 times. Natural gas itself or electricity may be used to power a liquefaction plant and the LNG produced is stored in double-walled, heavily insulated steel and stainless steel tanks.

Storage depots and liquefaction plants are complex and very expensive. FortisBC is spending \$400 million to expand an existing plant and build a second storage tank on Tilbury Island in Delta. The utility recently built an LNG storage tank at Mt. Hayes, near Ladysmith on Vancouver Island. Neither of these

February 2014.

Specialized LNG carriers have been in service for decades as global LNG trade has increased. Most are dual fuel, partly powered by LNG boiling off from their cargos. Other types of LNG-powered vessel are still rare. Norwegian agencies have been pioneers in the field, operating tugs, ferries, offshore supply and coast guard vessels since 2000. According to the DNV GL classification society, there are over 120 LNG-powered vessels (in addition to the hundreds of dual fuel LNG carriers) operating or under construction.

The demand for LNG-powered vessels

Recently the International Maritime Organization (IMO) updated and adopted a new safety code for ships burning gases and other low flashpoint fuels, known as the *IGF Code*. That move should remove any uncertainty about using LNG for ship owners and operators. Stricter IMO Tier III and U.S. Environmental Protection Agency (EPA) Tier 4 standards for marine emissions will be coming into force soon, and they are causing a rethink for vessel operators as existing diesel engines



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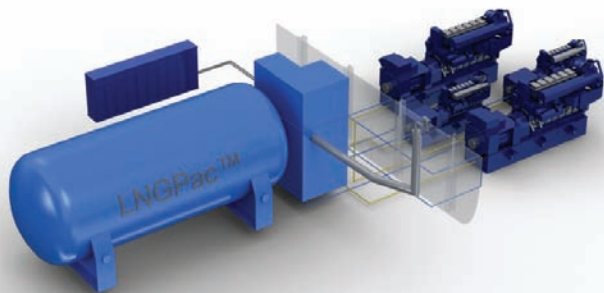


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may require modifications to comply. LNG is cleaner burning than ultra-low sulphur diesel fuel in terms of carbon dioxide, nitrogen oxides and particulates produced by combustion. It is also much cheaper, and predicted to remain so for at least the near future. Various engine makers have developed LNG and dual fuel installations based on diesel blocks and components and, on this coast, the LNG supplier FortisBC has offered incentives for fleet operators to offset some of the costs of installing LNG fuel systems.

A safe fossil fuel

LNG is probably the safest fossil fuel, being non-toxic, non-corrosive and difficult to ignite.

According to FortisBC corporate communications advisor, Michael Allison, "LNG has no odor because it lacks the rotten egg-like odorant, mercaptan, which is found in compressed natural gas, the traditionally delivered natural gas used in customers' homes and businesses. This is because prior to reaching -162 degrees C, mercaptan solidifies and separates from the gas. Methane detectors are installed in areas where LNG is used, and are important when working around LNG to detect any leaks. Leaking LNG, which does not contain any odorant, will quickly evaporate under ambient temperatures and be vented into the atmosphere with little impact on the surrounding environment."

LNG Canada's website states, "LNG has the best shipping record of any industry ... over 50 years without any significant incident resulting in a loss of cargo at sea or in port."

LNG storage

LNG has 60 percent of the energy density of diesel fuel and must be stored in bulky, insulated pressure tanks. These factors limit range or endurance. Providing dual fuel capability makes sense given limited space for LNG tanks and limited LNG fuelling infrastructure. The trade-off is that such engines may not be fully optimized for either diesel or LNG, and the fuel system is more complex, requiring two sets of tanks and fuel lines.

Short sea ferries are good candidates for LNG, as they operate on limited routes and regular schedules. They could accommodate LNG tanks large enough to allow useful endurance.





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Propulsion

Smaller vessels may need to be redesigned to provide central hull space for LNG tanks and controls (see the sidebar *RANGLer 3600* on page 23). Retrofitting a vessel for LNG power may require fuel tanks to be installed on deck.

Dual fuel vessels coming to the BC coast

Within the next few years, there could be five or more LNG-powered dual-fuel ferries operating on this coast. BC Ferries is planning to repower its pair of 166 m flagships, *SPIRIT OF BRITISH COLUMBIA* and *SPIRIT OF VANCOUVER ISLAND*, with dual fuel systems. This conversion has been announced as part of the ships' mid-life upgrades in 2017 and 2018.

BC Ferries has also ordered a trio of Intermediate-class ro-ro ferries designed and constructed by Remontowa Shipbuilding in Poland. The 107 m double-ended vessels will each carry 145 cars and 600 passengers, and be capable of 15.5 knots. Each ferry will be powered by three medium speed Wartsila 20DF series 8-cylinder engines and the LNG tank will be central in the vessel. The first ferry is scheduled for delivery in mid-2016. BC Ferries expects to save around \$12 million in fuel costs per year when all five vessels are in service.

Meanwhile, Seaspan Ferries has ordered a pair of innovative 149 m cargo ferries to operate on its scheduled truck and trailer service between Delta, Surrey and Vancouver Island. The dual fuel hybrid vessels are designed by VARD Marine Inc (Vancouver) and will be built by Sedef Shipyard in Turkey (see *In the Shipyards*, page 77). Each ferry will carry 59 trailers and

be capable of 16 knots. Propulsion will be twin Wartsila W9L 34DF engines/generators, and 84 Corvus Energy AT6500 advanced lithium polymer batteries. The batteries will power the ship during low-load operations and when alongside. Schottel will provide dual propeller high efficiency electric azimuthing drives. Like hybrid road vehicles, periods of battery operation will reduce the ferries' overall fuel consumption and emissions. Delivery is expected late in 2016.

Tanker trucks will service all these dual fuel ferries. LNG will be the primary fuel, with diesel serving as pilot and backup fuel.

Washington State Ferries is planning to gradually convert its six 100 m Issaquah class ferries to LNG or dual fuel. It appears LNG tanks would be mounted on the upper decks.

Other LNG fueled vessels we may see along this coast in the next few years could include cruise ships travelling to Alaska, and LNG carriers operating from new BC export terminals.

In pursuit of lower operating costs and to comply with emissions regulations, LNG has become a viable fuel for some types of shipping. DNV GL predicts 1,000 LNG-powered ships (and probably hundreds of LNG carriers) will be in operation globally by 2020.

It appears the future of marine fuels will be diverse, with heavy fuel oil, diesel, LNG, biofuels, batteries, and hydrogen fuel cells all possibly in use.

David Conn is a Vancouver-based marine writer and editor and a regular contributor to Western Mariner.

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RANGLer 3600:

LNG-powered terminal support/tanker escort tug

GRAPHIC COURTESY ROBERT ALLAN LTD.



LNG is presently emerging as the most viable alternative fuel to conventional diesel for many classes of ships, and in the tug market this is certainly also the case. The principal attraction of LNG is the ability to achieve low emission standards without the costly and bulky after-treatment components required on diesel engines, which also result in much larger casings and exhaust trunks, thus impeding operational visibility. The downside in a small vessel such as a tug, however, is the large volume required to accommodate LNG storage tanks and their associated control systems. Ultimately the range and endurance of a tug with LNG is severely compromised in comparison to a diesel-powered tug of the same dimensions.

Taking the traditional tugboat configuration and squeezing in the storage tanks most typically severely impacts the space available for storage and the crew accommodation. Robert Allan Ltd (RAL) decided to take a completely fresh approach

to an LNG tug design and not be constrained by conventional tug layouts. Starting with the essential basics of tug design and operations, it was ensured that the primary working deck layout was not compromised. The next priority was to most efficiently locate the LNG storage and distribution requirements with the associated engines. The rest of the design requirements (accommodations, control rooms, stores etc.) were then fitted into available spaces in a logical and sensible manner.

On many tugs today, especially those dedicated to terminal support or escort towing, the aft deck is essentially redundant, often a large empty area. A well-designed modern terminal tug should be able to tow and manoeuvre equally well going in either direction, hence has no need for an aft winch. RAL considered the aft deck area for locating the accommodation

facilities displaced by the LNG tanks.

These concept explorations gave birth to a truly modern LNG-powered tug design: the RANGLer class (Robert Allan's Natural Gas Liquefied). Departing from "traditional" diesel tug designs, the RANGLer deckhouse is biased aft for best visibility from the wheelhouse and an efficient working deck forward. The spacious crew accommodations are located within a stern "castle" replacing the below deck accommodations of conventional tug designs.

The space forward of the engine room is used for maximum LNG storage capacity, and is configured to allow easy installation and removal of the entire LNG tank system as an LNG Fuel Module. The IMO Type C LNG storage tank and gas processing equipment, the bunkering station, engine gas regulation units, controls, gas-related ventilation fans, enclosures and access ways are all integrated into the single module which can be tested and approved ahead of time, and installed efficiently

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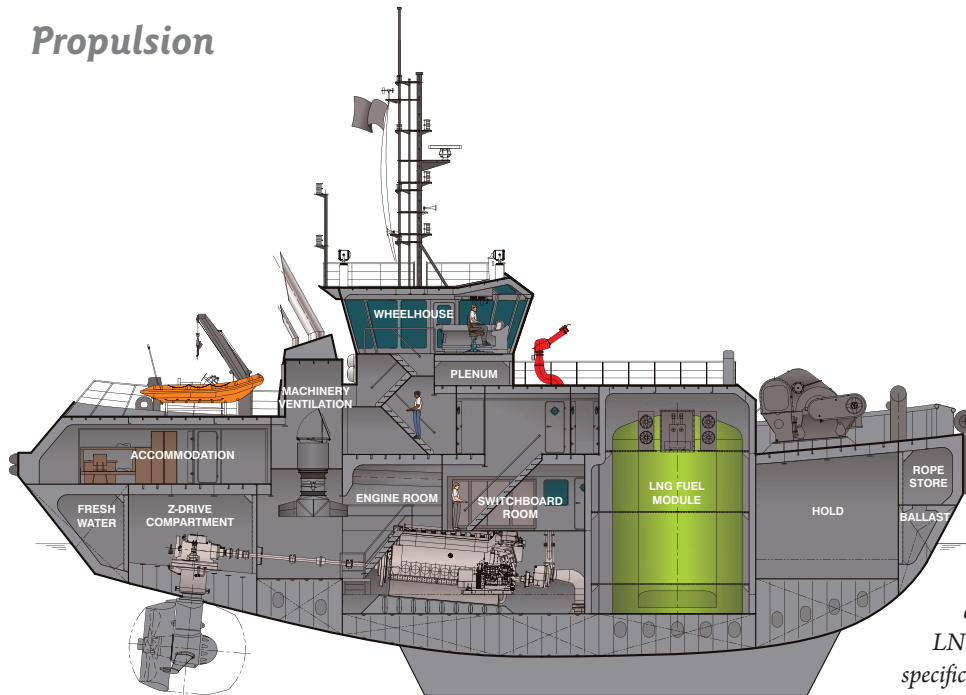


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Propulsion

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It's unusual to see a hold space on a tug of any type, so *Western Mariner's* David Conn asked Robert Allan Ltd about the RANGLer's hold. Vince den Hertog, RAL's Vice President of Engineering explained, as follows:

Unfortunately the hold space is too narrow to use efficiently for the LNG tank itself, unless the tank diameter was smaller (which would have a big impact on LNG capacity). The hold contains the port and starboard anchor chain lockers (not shown in the section) and is used for stores. To protect the LNG tank from collision damage there are specific rules about how close the outside can be to the hull side-shell and bottom. To maximize LNG capacity and maintain the necessary clearance

and with less risk than if equipment is installed separately in a more piecemeal way. – *Robert Allan Ltd*

As the section drawing of the RANGLer 3600 illustrates, there is a hold space located forward of the LNG fuel module.

for collision and fire protection, as well as restrictions on where crew accommodations can be, it makes sense to orient the tank vertically and place it aft from the bow where more clearance is available. That said, the situation with the hold does illustrate the challenge of using space as efficiently as on a conventional tug. ◀

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Welcome to Mari-Tech 2015

On behalf of the organization committee it is my great pleasure to welcome you to Vancouver and to Mari-Tech 2015 – Changing Tides: The Pacific North-West.

The Conference has been designed to provide an innovative and comprehensive overview of the latest marine technology developments affecting the marine industry, including owners, operators, designers, equipment suppliers and regulators.

Many distinguished marine professionals have offered their support and time to participate in Mari-Tech 2015.

Presentations will be provided in the form of a panel session on Pacific Coast Tanker Safety as well as focused presentations on marine technologies that were carefully selected by the Abstract Review Committee from papers submitted from around the globe. The selected presentations ensure that this year's Conference will be engaging and valuable.

We thank the marine industry for its generous support, Creative Relations Event Planning for its excellent arrangements in all aspects of the Conference, our dedicated Mari-Tech 2015 planning committee, colleagues, volunteers, friends and families for their untiring help and advice. But most of all we are grateful to you, the Conference attendees, without whom all of this work would have been for naught. It is your input, insight and involvement that make this Conference worthwhile.

We hope that you will enjoy Mari-Tech 2015 and that interaction with your colleagues from many different countries will stimulate a creative exchange of ideas and will be personally rewarding. We also trust that you will enjoy your visit to the very beautiful and exciting city of Vancouver in April 2015.

Tony Vollmers
Conference Chair

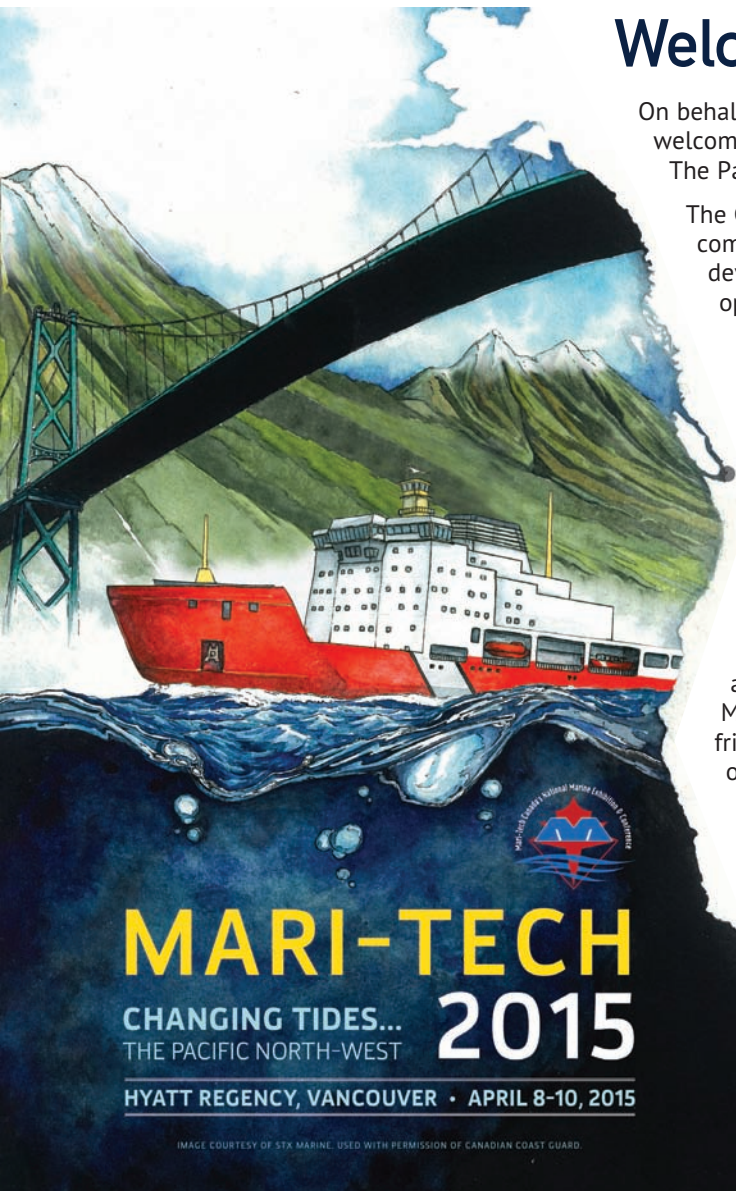


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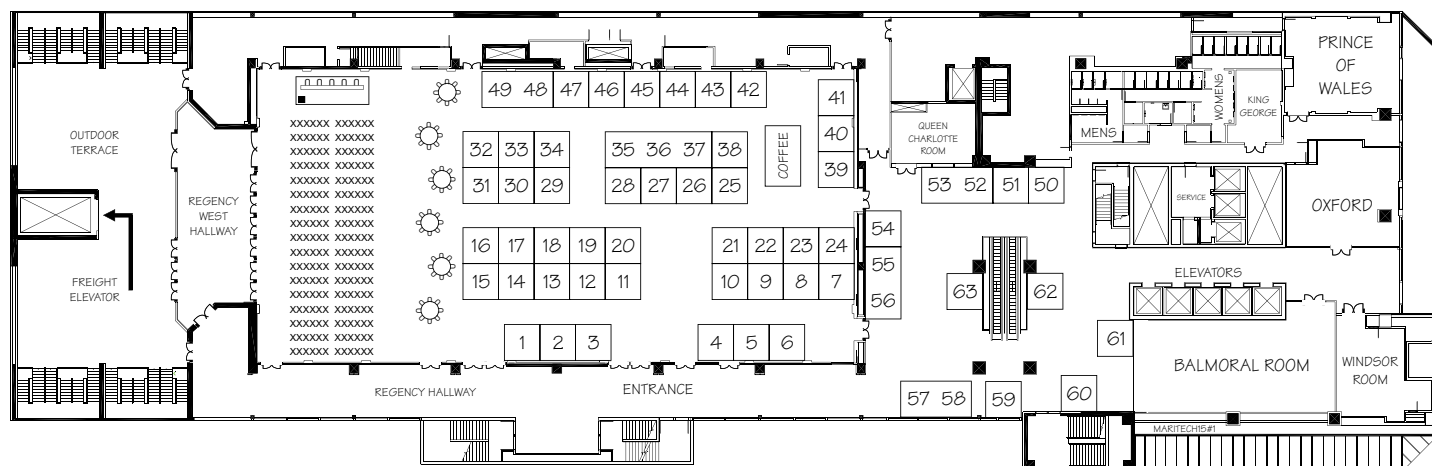
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Speaker and Volunteers Inquiries

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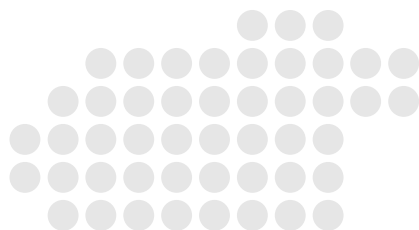
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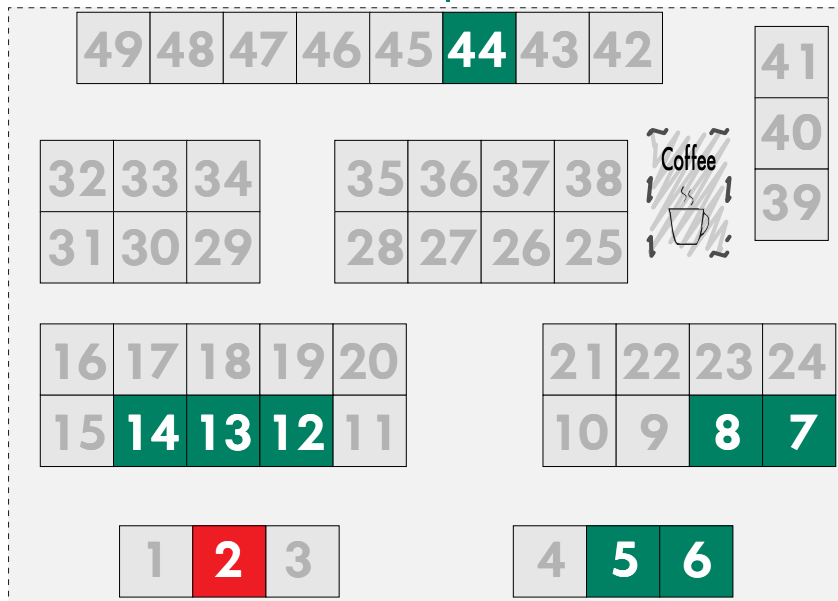
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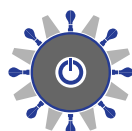
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CONFERENCE SCHEDULE

TUESDAY, APRIL 7, 2015 LOCATION

20:00-24:00 **Exhibition Set-up** Regency Ballroom/Foyer

WEDNESDAY, APRIL 8, 2015 LOCATION

07:00 - 12:00 **Exhibition Set-Up** Regency Ballroom/Foyer

10:00 - 19:00 **Pre-Registration Opens** Plaza Foyer
Second Level

13:00 - 16:00 **Public Works Procurement Outlook** Regency Ballroom E

TBA **Canadian Coast Guard B2B Meetings** TBA

16:00 - 21:00 **Expo Hall Opens** Regency Ballroom/Foyer
Open to all Registered Attendees

16:00 - 21:00 **Marine Educational Zone** Balmoral

18:00 - 21:00 **Mari-Tech 2015 Opening Reception in Expo Hall** Regency Ballroom/Foyer

THURSDAY, APRIL 9, 2015 LOCATION

06:00 - 17:00 **Registration Opens** Plaza Foyer
Second Level

07:00 - 07:55 **Breakfast** Regency Ballroom/Foyer
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TBA **Canadian Coast Guard B2B Meetings** TBA

08:00- 08:45 **Opening General Session** Regency Ballroom E
Opening Remarks by Mari-Tech 2015 Chair
Tony Vollmers (CIMarE)
CIMarE Medal of Excellence
Keynote Speaker: TBA

08:45 - 10:00 **Tanker Safety On the Pacific Coast-Panel Session** Regency Ballroom E
Moderator/Panel Chair:
Peter Bernard Q.C - Maritime Lawyer (Ret.)

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Panelists:

Robert G. Allan - Executive Chairman of the Board,
Robert Allan Ltd.

Dr. Lance Barrett-Lennard - Marine
Biologist, Vancouver Aquarium

Capt. Stephen Brown - President, Chamber of
Shipping of British Columbia

Capt. Brian Falconer - Marine Operations Program
Coordinator, Raincoast Conservation Foundation

Karen Wristen - Executive Director Living Oceans
Society

Kevin Obermeyer - CEO Pacific Pilotage Authority

10:00 - 17:00 **Expo Hall Opens** Regency Ballroom/Foyer
Open to all Registered Attendees

10:00-17:00 **Marine Educational Zone** Balmoral

10:05 - 10:35 **Refreshment Break /** Regency Ballroom/Foyer
Networking in Expo Hall
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10:40 - 11:25 **T-101 Shipping Noise** Regency Ballroom E
and its Potential Impacts on Marine Life
Kathy Heise - Vancouver Aquarium

11:30 - 12:15 **T-102 Preventing the Spill:** Regency Ballroom E
Tugs for Tankers
Mike Phillips - Robert Allan Ltd.

12:20 - 13:20 **Keynote Presentation Lunch** Plaza B
Keynote Speaker: Mike Corrigan - Second Level
President and CEO BC Ferries
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13:25 - 14:25 **CIMarE AGM Session** Plaza B
Closed meeting for CIMarE Branch Second Level
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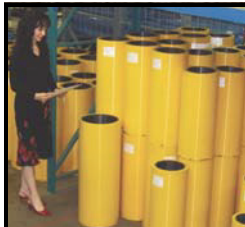
13:25 - 14:10 **T-103 West Coast Marine** Regency Ballroom E
Industry in Support of HMCS CORNER BROOK
Incident
Ron Ogoneik - Babcock Canada
Jocelyn Turgeon - Dept. of National Defence

14:15 - 15:00 **T-104 Survival of the Fittest:** Regency Ballroom E
The Challenges for Today's Modern Shipyard
Heiko Oldendorf - Free D Graphics

15:00 - 15:50 **Refreshment Break /** Regency Ballroom/Foyer
Networking in Expo Hall

15:55 - 16:40 **T-105 Benefits with** Regency Ballroom E
Energy Storage in LNG-Operated Ice Breaker
Jan-Erik Räsänen - ABB Marine

16:45 - 17:30 **T-106 Dynamic** Regency Ballroom E
Requirements of Vessels & Challenges of
Integrating LNG and Hybrid Systems Into the
New Seaspan Ferries
John Fowles - Seaspan Marine



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On Thursday April 9th, Mari-Tech 2015 Conference and Exhibition's Evening Event will be held at the Vancouver Aquarium from 18:30-23:00.

This spectacular location, surrounded by aquatic wildlife, is located just inside the world famous Stanley Park, in the heart of Vancouver. Guests will have the opportunity to network with many marine industry leaders and fellow colleagues in this unforgettable setting.

Tickets can be purchased both individually or with your Conference & Exhibition pass on the Mari-Tech 2015 conference website <http://www.mari-tech.org/index.php/mari-tech-2015-home>.



Vancouver Aquarium: 845 Avison Way (Stanley Park), Vancouver, BC

| FRIDAY, APRIL 10, 2015 | | LOCATION |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 06:30 - 13:00 | Registration Opens | Plaza Foyer Second Level |
| 07:00 - 08:00 | Breakfast | Regency Ballroom/Foyer |
| TBA | Canadian Coast Guard B2B Meetings | TBA |
| 08:05 - 08:35 | Opening Presentation The Polar Code: Implications for Designers and Operators Rob Hindley - <i>Lloyd's Register Canada</i> | Regency Ballroom E |
| 08:40 - 09:25 | T-201 Tier III Technologies for Large Bore Diesel Engines Les Gingell - <i>MAN Diesel and Turbo</i> | Regency Ballroom E |
| 09:00 - 15:00 | Expo Hall Opens Open to all Registered Attendees | Regency Ballroom/Foyer |
| 09:00-15:00 | Marine Educational Zone | Balmoral |
| 09:30 - 10:15 | T-202 Canadian Europe Free Trade Agreement (CETA): Maritime Matters John Bromley - <i>Bull Housser LLP</i> | Regency Ballroom E |
| 10:15 - 11:00 | Refreshment Break / Networking in Expo Hall | Regency Ballroom/Foyer |
| 11:05 - 11:50 | T-203 Enhancing Performance, Availability and Reliability of Shipboard Equipment with Ultrasound Walter Vervloesem - <i>IMCS Group</i> | Regency Ballroom E |
| 11:55 - 12:40 | T-204 Application of Modeling and Simulation Methodologies to Enhance Naval Survivability Maggie Nate - <i>Alion Science and Technology</i> | Regency Ballroom E |
| 12:45 - 13:45 | Lunch / Networking in Expo Hall | Regency Ballroom/Foyer |
| 13:50 - 14:35 | T-205 LNG Fuel Competitive Advantage & Business Case Returns John Hatley - <i>Wärtsilä</i> | Regency Ballroom E |
| 14:40 - 15:00 | Conference Closing Remarks | Regency Ballroom E |



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CONFERENCE PROGRAM

THURSDAY APRIL 9, 2015

OPENING PANEL SESSION

PAN-100

Tanker Safety on the Pacific Coast

08:45-10:00

Regency Ballroom E

Panelists will each present a perspective on the proposed expanded tanker operations on the BC Coast and then engage in a brief debate on the merits of their arguments, followed by a Q&A session with the audience. This is believed to be the first occasion in which multiple views on this important subject will be discussed in a public forum.

Moderator: Peter Bernard Q.C.

Panelists:

Robert G. Allan P.Eng. – Executive Chairman of the Board, Robert Allan Ltd.

Dr. Lance Barrett-Lennard - Marine Biologist, Vancouver Aquarium

Capt. Stephen Brown - President, Chamber of Shipping of British Columbia

Capt. Brian Falconer - Marine Operations Program Coordinator, Raincoast Conservation Foundation

Kevin Obermeyer - CEO, Pacific Pilotage Authority

Karen Wristen - Executive Director, Living Oceans Society

TECHNICAL SESSIONS

Regency Ballroom E

T-101

Shipping Noise and its Potential Impacts on Marine Life

10:40-11:25

An overview of the scientific literature on what is known about the impacts of noise on marine animals and how underwater noise levels have changed in the eastern North Pacific over the past 50 years. We will present a biologist's perspective on potential mitigation measures.

Kathy Heise, Research Associate – Cetacean Research Lab at the Vancouver Aquarium

Kathy is a Research Associate at the Cetacean Research Lab at the Vancouver Aquarium. She has been interested in the issue of underwater noise and its impacts on marine life

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since the early 2000s when she and her co-author, Lance Barrett-Lennard, were asked to provide a summary of the impacts of underwater noise on marine mammals to the Royal Society of Canada for their work on assessing the potential impacts of lifting the moratorium on oil and gas exploration on the BC coast.

T-102

Preventing the Spill: Tugs for Tankers

11:30-12:15

The potential arrival of large crude tankers and LNG carriers in BC's coastal waters will require high-performance tugs with large force generation capabilities, both for escort and rescue towing duties. In most cases, this will require new purpose-built tugs which could dwarf any tugs currently operating in BC waters.

Mike Phillips, P.Eng., *Naval Architect - Robert Allan*

Mike Phillips, P.Eng., is a Naval Architect with Robert Allan Ltd., of Vancouver, BC, a company recognized worldwide as a leader in the design of tugs, research, and other working vessels. Mike's career has focused on vessel design for clients worldwide and he is acutely aware of the challenges associated with designing for BC's harsh coastal environments.

KEYNOTE LUNCH SPEAKER

12:20-13:20

Mike Corrigan, *President & CEO-BC Ferries*

Mike has been a senior executive with BC Ferries Ltd., one of the largest ferry companies in the world, since joining the

organization in 2003. His first role was Executive Vice President of Business Development (2003 – 2006) and then Chief Operating Officer (2006 – 2011). While COO, he was responsible for creating and leading, in partnership with BC Ferries Marine Workers' Union, the company's SailSafe program which has established a "just" safety culture throughout the company.

Prior to his business career Mike played professional hockey in the Detroit Red Wings organization for four years and during his junior hockey career won the Memorial Cup in 1980 with the Cornwall Royals. He has two adult daughters and lives in Victoria with his wife, Shari, and black Lab, Ace.

T-103

West Coast Marine Industry in Support of HMCS CORNER BROOK Incident

13:25-14:10

The importance of industry collaboration is highlighted in this presentation depicting the efforts deployed to plan and execute the surveys and repairs of HMCS CORNER BROOK, a Royal Canadian Navy submarine which ran aground in Nootka Sound. This presentation will showcase the technical complexity of the project and provide recognition to industry partners.

Ron Ogoniek P.Eng., *Director of Engineering-Babcock Canada*

Ron graduated with honours from Queens University in Mechanical Engineering and is a licensed Professional Engineer in Ontario and British Columbia. Since 2008, he has been working with Babcock Canada (formerly Strachan &



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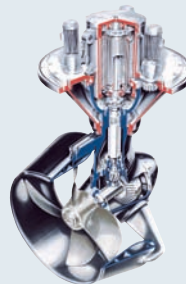
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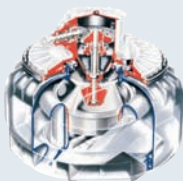
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Jocelyn Turgeon P.Eng., *System Authority-Department of National Defence*

Jocelyn is a professional engineer with l'Ordre des ingénieurs du Québec. He holds graduate and post-graduate degrees in mechanical engineering from Université de Sherbrooke and Massachusetts Institute of Technology. He retired from the Royal Canadian Navy in 2008 and is currently employed as the System Authority for Victoria class submarines' Platform Systems within the Department of National Defence.

T-104

Survival of the Fittest: The Challenges for Today's Modern Shipyard

14:15-15:00

In a recent survey of its clients, free d graphics found that most recognized the need to improve their project management and had already identified areas where significant improvements could be made. The top four areas cited were: monitoring costs, risk management, collaboration, and multisite team management.

Heiko Oldendorf, *President & CEO - free d graphics*

Heiko Oldendorf was born and raised in Leipzig, Germany and now resides in Vancouver BC. For the past 20 years Heiko has worked in the field of Product Lifecycle Management for companies such as Daimler AG, Volkswagen AG, Audi AG, Porsche AG and Meyer Werft.

T-105

Benefits with Energy Storage in LNG-operated Ice Breakers

15:55-16:40

An examination of alternative energy storage in LNG-operated ice breakers and the benefits in high torque demand operations, including enhanced dynamic support in fast load changes.

Jan-Erik Räsänen, *Business Manager for Energy Efficiency - ABB Marine*

Jan-Erik held several management positions in the process industry before joining ABB Marine in 2009. In 2011 he assumed global responsibility for the company's energy efficiency related business where his focus is on improving vessel efficiency, introducing technology solutions for electric and hybrid propulsion, and offering operational advice. Jan-Erik is also responsible for ABB's cruise and ferry modernization and mid-life upgrade business.

T-106

Dynamic Requirements of Vessels & Challenges of Integrating LNG and Hybrid Systems Into the New Seaspan Ferries

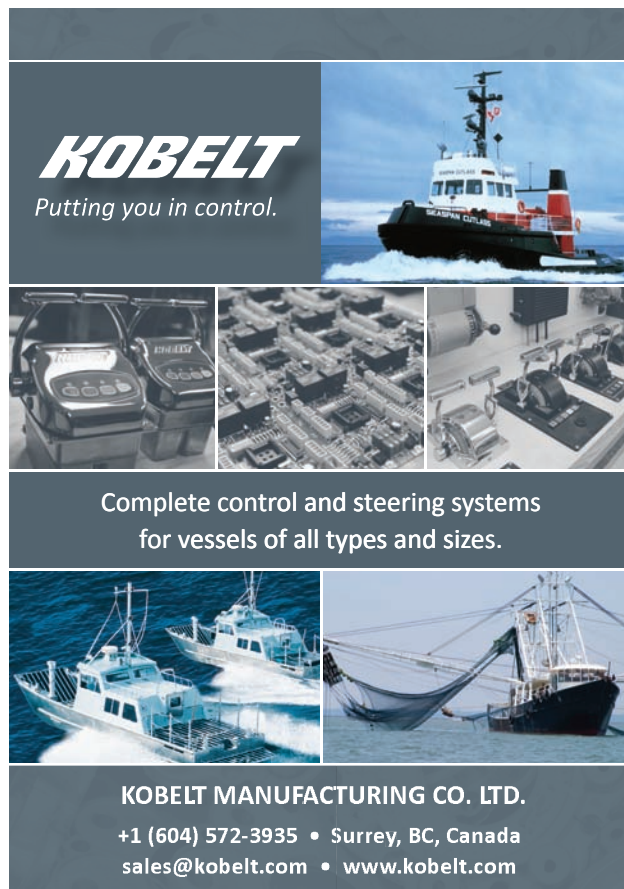
16:45-17:30

A review of the dynamic requirements of vessels that operate for Seaspan Ferries as well as the challenges of integrating LNG and Hybrid systems into the new Seaspan Ferries which are currently in build in Turkey.

John Fowles, *Vice President, Fleet Maintenance - Seaspan Ferries*




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John is a graduate of the Naval Architecture program of the College of Fisheries, Navigation and Marine Electronics in St John's NL and has worked with several Vancouver area naval architecture firms, gaining experience in vessel design, full scale testing and trials. He joined Seaspan in 1996 and has been in his current role of Vice President, Fleet Maintenance since 2008.

FRIDAY APRIL 10, 2015

TECHNICAL SESSIONS

Regency Ballroom E

Opening Presentation

The Polar Code: Implications for Designers and Operators

08:05-08:35

The Polar Code is now finalized at the IMO and will be a statutory imperative for any ship operating north of 60N or south of 60S. This overview will focus on the practical preparation required for designers and operators, and will highlight the impact the Code is likely to have on existing ship operations and the steps anticipated for compliance.

Rob Hindley, *Lead Specialist, Arctic Technology - Lloyd's Register Canada*

Rob's role at Lloyd's Register Canada includes coordination of projects relating to the implementation of new technologies for Arctic ship design and operation. He also represents IACS at the IMO on the development of the Polar Code. He

previously worked for Aker Arctic Technology in Finland as a Project Engineer on design and consultancy projects relating to icebreakers and ice-going ships including a lead role in the design at Aker Arctic for the CCG Polar Icebreaker.

T-201

Tier III Technologies for Large Bore Diesel Engines

08:40-09:25

Examining the technologies and trade-offs of different methods used to meet Tier III requirements for large diesel engines.

Les Gingell, *Vice President, Marine Sales, Commercial Applications - MAN Diesel and Turbo*

Les Gingell has been in the Marine industry for over 30 years, working with gas turbine engines and large diesel engines for some of the most advanced propulsion systems ever installed in marine vessels.

T-202

Canadian Europe Free Trade Agreement (CETA): Maritime Matters

09:30-10:15

CETA is forcing certain maritime activities in Canada, including dredging and some short sea shipping, to open to EU competition. Canadian maritime union organizations have expressed grave concerns about the potential impact on the domestic fleet. Are those concerns legitimate? Does CETA provide opportunities for Canadian maritime enterprises in the EU?

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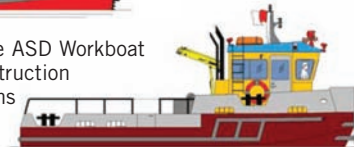
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John Bromley, Lawyer - Bull Housser LLP

John is a partner at the law firm Bull Housser LLP and has practised maritime law for 30 years. He is recognized by many organizations (Chambers Global, Lexpert, Expert Guides, Who's Who in Shipping) as one of the leading maritime lawyers in Canada. He was recognized as the Maritime Lawyer of the Year (Vancouver) by Best Lawyers in Canada for 2014. He handles both litigation and transactional matters for clients across the maritime industry including vessel owners, insurers to marine service providers.

T-203

Enhancing Performance, Availability and Reliability of Shipboard Equipment with Ultrasound

11:05-11:50

Under the motto simplicity for those who need and sophistication for those who want, the presentation will explain how properly engineered ultrasound solutions and applications allow for quality shipping by improving environmental requirements and meeting customers' needs.

Walter Vervloesem, Chairman - IMCS Group

Walter Vervloesem is an ex merchant navy officer, presently the Chairman of the IMCS Group of Companies (19 marine survey and consultancy offices worldwide) and manager for marine applications with SDT International (Belgium). He is also managing director of the IMCS Training Academy and has authored major reference works published by the Nautical Institute (UK).

T-204

Application of Modeling and Simulation Methodologies to Enhance Naval Survivability

11:55-12:40

Outlining the utilization of an integrated suite of validated physics and rule-based methodologies which integrate both initial damage effects and recovery analysis into a single modeling and simulation software package to perform design evaluation, requirements assessment, and resource allocation. These efforts result in increased survivability for both combatant and non-combatant ships.

Maggie Nate NA, Naval Architect - Alion Science and Technology

Maggie Nate is a Naval Architect with Alion Science and Technology in Washington DC where she manages international naval survivability projects. In this role she is responsible for the reduction of susceptibility and vulnerability, and the enhancement of recoverability, for both combatant and non-combatant ships through the use of advanced modeling and simulation analyses. Maggie is a graduate of Virginia Tech with a B.Sc. in Aerospace and Ocean Engineering.

T-205

LNG Fuel Competitive Advantage & Business Case Returns

13:50-14:35

Executive decisions are ultimately based upon business economics and competitive advantage. This presentation delves into the fundamental drivers for marine LNG fuel exemplified by a Business Case Application. The Case demonstrates



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John Hatley PE, *Americas Vice President Ship Power - Wartsila North America*

John has over 30 years of combined marine experience in business development, project management of domestic and overseas vessel construction, owner's representation, ship operations, and vessel design. Prior to joining Wartsila he

held positions with GE Transportation, Marine Industries Northwest, First American Bulk Carriers, John J. McMullen Naval Architects, US Container Lines, and Trinidad Tankers. He is a licenced Chief Engineer with eight years sea experience and in 2008 he received the Rear Admiral McCready Award for Outstanding Achievement in Marine Engineering.

Closing Session

14:40-15:00

THANK YOU VOLUNTEERS & COORDINATORS

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WATERFRONT VANCOUVER HARBOUR:

Burrard Inlet, Dollarton and False Creek

Inbound to Burrard Inlet under Vancouver's iconic Lions Gate bridge is Island Tug & Barge's 75-ft, 1,800-hp tug CINDY MOZEL (1974, Vito Steel Boat & Barge Construction) towing the 256-ft, 26,650-barrel fuel barge ITB RESOLUTION (2008, Penglai Bohai Shipyard, China). Island Tug & Barge maintains its base of operations in Burnaby east of the Second Narrows Bridge, and in addition to general marine towing and logistics the company specializes in bulk fuel transportation and marine fuel sales and marketing — one of the regular runs is out to Nanaimo to supply the Suncor/Petro-Canada and Imperial transfer facilities there. The CINDY MOZEL was featured on the cover of the February 2015 *Western Mariner*, in a striking cold-weather photo taken when the tug tied up in Tuktoyaktuk NWT over the winter of 2013.

PHOTOS AND TEXT BY SIMON HILL (EXCEPT AS MARKED)

There's no denying that Port Metro Vancouver is a bustling place: After a banner 2013, Canada's largest port had another record year in 2014, with total cargo tonnage up by three percent to almost 140 million tons. The growth came mostly in the form of bulk cargo, with potash up 14 percent and grain up a whopping 22 percent thanks to higher-than-expected harvests and increased capacity. Breakbulk and containerized cargo held roughly steady, with volumes down one percent over 2013, while automobile shipments — which are handled on the Fraser River rather than in Vancouver Harbour — were the softest sector, down seven percent. On the tourism front, cruise vessel visits increased by three percent and passenger numbers held steady.

Supporting the port's activities is a vast array of marine service providers: shipdocking tugs, vessel supply and repair outfits, bunkering, marine construction, tug and barge companies, oil spill response, policing and harbour patrol services, and the list goes on. Behind it all, the Vancouver Fraser Port Authority administers the port's lands, directing growth and ensuring that operators comply with regulations and move goods safely. A recent change saw the port exit the waterlot lease business over much of the Fraser River's and North Arm's lower reaches, with the head lease for these areas — which include log storage, marinas, and float homes — reverting to the province (the port retains responsibility for navigational jurisdiction and for upland leases adjacent to the waterlots).

Western Mariner laced up our dockwalking boots for a surprisingly sunny tour of Vancouver Harbour in early March, and here's some of what was happening ...



Fuelling up at the Chevron Legacy fuel dock is the 85-ft, 6,300-hp Robert Allan-designed (RAstar 2800 class) SEASPAN

KESTREL (2011, Sanmar Denizcilik Makina Ve Tic Ltd., Istanbul, Turkey). The CHEVRON LEGACY is also a Robert Allan

design, built in 2009 by Alaska Ship & Drydock and put into operation in January 2010 to replace the old S.O.B.C. No.5

which had been moored in Coal Harbour since it was built in 1959 (there used to be several fuel docks in Coal

Harbour, but Chevron has been the sole provider since Esso removed its barge in 2008). The double-hulled CHEVRON

LEGACY has a capacity for 1,284,000 L of marine diesel, 160,500 L of gasoline and 79,100 L of bulk lube oil, with a

maximum discharge rate of 50,000 L/hour. The decks are designed to capture rainwater and oil contamination for onboard processing and disposal ashore, while rainwater landing on the roof is directed overboard through large scuppers without ever touching the decks.

Waterfront Vancouver Harbour: Burrard Inlet, Dollarton and False Creek



Hauled for its annual maintenance at Vancouver Shipyards is the classic 105-foot converted tug St. Eval. The St. Eval was built as the CHIEFTAIN in 1929 by Scott & Sons Co. at Bowling Green, Scotland for Glasgow's Steel & Bennie Ltd. The Warrior-class tug was originally fitted with a steam engine and worked escorting the square-riggers of the day in and out of harbour, before being commissioned by the Royal Navy to work as a rescue tug during World War Two. In the 1950s it was converted to diesel power, fitted with a Cleveland V16 1278A diesel, and in 1967 it was sold to Falmouth Towing and renamed St. Eval after a Cornish saint. The tug worked for Falmouth Towing until 1987 when it was

partially restored and became the tender for English yachtsman Peter de Savary's failed assault on the America's Cup. It was purchased in the early 1990s by Dennis Washington, who completed the restoration and converted the tug in Seattle for use as his personal pleasure yacht.

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The latest big landmark along the North Shore waterfront is Vancouver Shipyard's new 300-tonne gantry crane *Hiyi Skwáyel* ("big blue"), which was shipped to Vancouver in February 2014 and assembled and commissioned over the following months, going into service in the summer of 2014. The crane is a major component of Seapan's \$200-million Shipyard Modernization Project, undertaken to provide the state-of-the-art facilities needed to deliver non-combat vessels for the Royal Canadian Navy and Canadian Coast Guard in the near-to-medium term, while in the longer term establishing a legacy shipbuilding centre capable of competing for shipbuilding contracts in world markets. At 80 m (262 ft) high and 76 m (250 ft) wide the crane is officially Canada's largest fixed gantry crane, and it was named through a contest among North Vancouver's elementary school students.



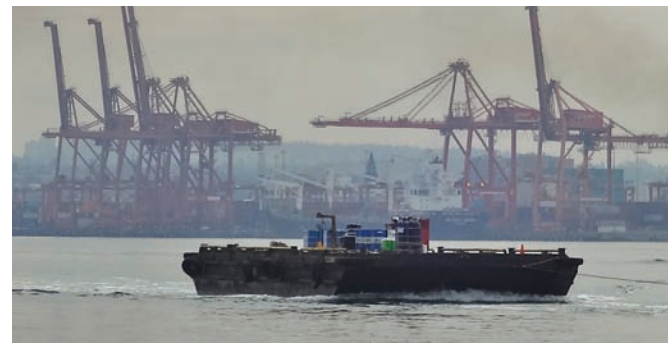
Just off Brockton Point east of Coal Harbour *Western Mariner* caught up with a crew from the Coast Guard's Integrated Technical Services, Marine and Civil Infrastructure (MCI) group working on the Burnaby Shoal light. Despite its lack of Coast Guard livery, the workboat (an aluminum Stanley built by Connor Industries of Parry Sound, Ontario) is readily identified as a Coast Guard vessel thanks to its 200-hp Evinrudes, a power setup long favoured by the Coast Guard. The MCI group is responsible for maintaining all of the Coast Guard's equipment and infrastructure, including navigational buoys, fixed navigational aids, radio transmission sites and vessels. The group operates a Technical Services workshop in Victoria where buoys are cleaned, repaired and repainted, and where various fabrication projects are undertaken, producing everything from metal structures for mountaintop sites, to entire footbridge spans to ensure safe access at lightstations.

Onboard Vancouver Fraser Port Authority's new harbour patrol vessel VFPA 4 (which bears the ceremonial name *LHÁWICHEN*) are boatmaster Jason Krott and harbour patrol officer Rob Grant. The VFPA 4 and its sistership VFPA 5 were built by Daigle Welding and Marine and delivered in September 2014. Based loosely on the Nanaimo Port Authority's 39-ft *OSPREY*, the 43-ft VFPA vessels are fitted with twin Volvo D9-500 engine and drive packages, giving the vessels a top speed of slightly over 30 kts and a cruising speed of around 27 knots. A full suite of navigation and surveillance equipment including forward-looking infrared camera, side-scan sonar, radar and chartplotter allow the crew to monitor activities in the port night and day, in fair weather or



foul. Since taking delivery of the vessels the port has stationed VFPA 5 at Annacis on the Fraser River, with VFPA 4 stationed in Vancouver Harbour. Krott says the new patrol boats have been working out well — the crew swapped out the original VHF antennas for slightly shorter ones to clear the top of the boat shed, but other than that the design hasn't required any modifications. The port had just installed its full suite of custom information technology aboard VFPA 5 when *Western Mariner* visited, with VFPA 4 slated to get its IT install the following week. With the new boats now operational, the port sold its smaller patrol vessel *CELMAR VI* to the province for use on the lower reaches of the Fraser River as part of the recent head lease transfer to the province (see the introductory text on page 43). The *CELMAR VI* was one of the former North Arm patrol boats, and it has been renamed *VALERIE JONES* in memory of the North Fraser Port Authority's last serving harbour master.

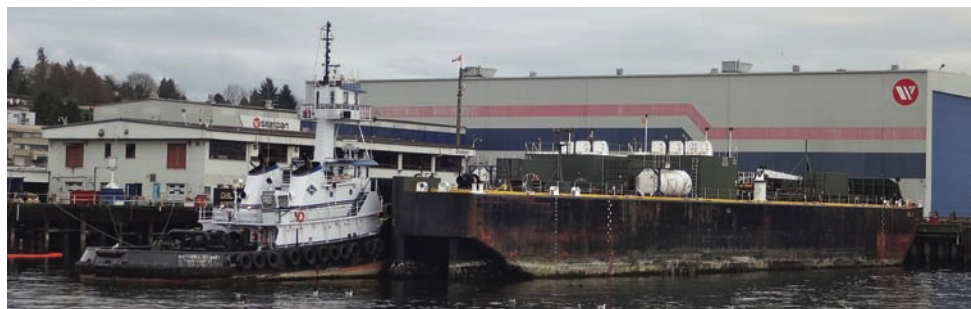
Waterfront Vancouver Harbour: Burrard Inlet, Dollarton and False Creek



The foot of Lonsdale in North Vancouver has been the city's commercial focus for 100 years, and was the transportation hub for much of the 20th century. But with changes in the shipbuilding industry and transportation usage the area became underused in recent years, and deterioration of the underlying 1930s-era deck structure necessitated major

renovations. The city created a conceptual plan for the area in 2010 and formalized plans for the area in 2014, starting the sub-surface construction process soon after. This includes removal of the 1930s-era deck at the eastern end of the site, stabilizing and defining the shoreline edge with a seismic wall, temporary relocation of the historic PGE (Pacific Great Eastern) railway station, and demolition of the old Cates maintenance shed (the Cates deck south of the shed location will remain). Construction of the public space will take place in two phases, with Phase 1 due for completion this spring and including Coppersmith shop frontage with a Tap & barrel restaurant in the historic Coppersmith building, East/West Spirit Trail, temporary North/South Spirit Trail, and open-space features including a bridge to the Shipyards area. Phase 2 is scheduled for construction in 2016 and will include upgrades to the Cates dock, water features (including a possible water park in summer and covered skating in winter), a permanent North/South Spirit Trail and Carrie Cates Court Frontage. Plans also include construction of a new Presentation House Gallery, final relocation of the historic PGE railway station, and possibly even a pier-mounted Ferris wheel.

Stopped in at Seaspan's Vancouver Drydock for class surveys and underwater maintenance are Kirby Corporation's 95-ft, 3,400-hp pusher tug NATHAN E. STEWART and its 288-ft, 50,000-barrel oil barge DBL-54. The DBL-54 was purpose-built for K-Sea

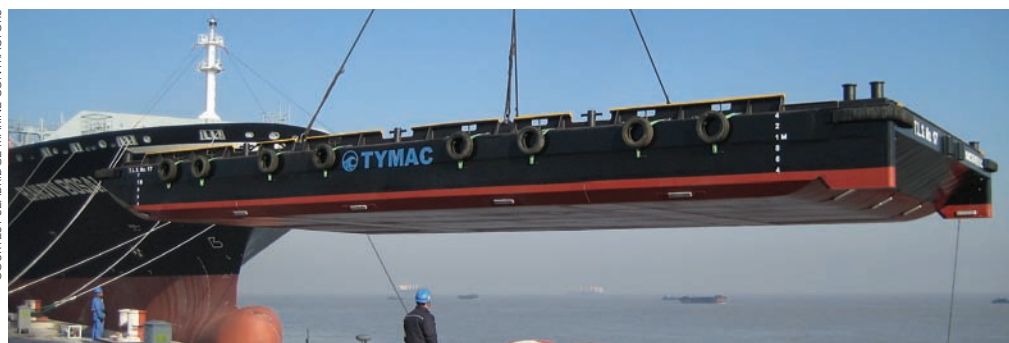


Transportation in 2010 by Zidell Marine of Portland, Oregon, to serve K-Sea's regular trade transporting fuel to Alaska from Washington State. Fitted with a JAK coupling system from Beacon Finland, the barge was paired with the converted NATHAN E. STEWART, which was built for Modern Continental Construction in 2001 and originally named LUDWIG E. The tug was renamed by K-Sea

Transportation in memory of a former employee who lost his life in an onboard accident in 2005. The NATHAN E. STEWART is powered by twin Cummins KTA-50 M2 diesel main engines, and was converted for pusher service in 2010 by Feeny's Enterprises of Kingston, New York. The tug and barge came under Kirby Corporation's ownership in July 2011 when Kirby acquired K-Sea.



Pictured at Seaspan's Vancouver Drydock facility are Crowley's 127-ft, 7,200-hp tug GUARDSMAN and BARGE 455-8, carrying a sub-sea structure destined for Cook Inlet in Alaska. Built in 1976 by McDermott Shipyard of Morgan City, Louisiana, the GUARDSMAN is an Invader class tug, the 12th tug of that type built for Crowley. It's powered by twin EMD 20-645-EG main engines with 4.345:1 Falk reduction gears turning five-bladed fixed-pitch stainless props. Towing equipment consists of a Markey TDSDW 36C double-drum winch carrying 3,000 feet of 2.75" wire on each drum. The tug and barge pair were in for class surveys and maintenance work.



Mariner). One of the new Kvichak vessels, the TYMAC SPRAY, was already in the water when *Western Mariner* dropped by, while the other, the TYMAC STORM, was on the hard undergoing final post-delivery preparations prior to launching (top right photo). In the meantime, the company was awaiting delivery of four new China-built barges from West Vancouver's Seabridge Marine. The barges, which were designed and built over a short seven-month period, were loaded onto a freighter in China in late February 2015 (see photo above) and were due for delivery at Lynnterm in mid-March. They'll be put to use by Tymac in the company's harbour barging services including the cruise ship service trade.

Towing the barge TLS No.7 (1981, Lincoln Steel Products, Richmond) loaded with drums of lube oil for a freighter anchored out in English Bay is Tymac Launch Service's 38-foot, 325-hp TYMAC RANGER (ex GULF RANGER, 1962, Star Shipyard/Mercers), with skipper Dave Price and deckhand Oscar Martin onboard. Tymac has undertaken a major upgrade and expansion of its fleet over the past few months, with delivery of a pair of new 34-ft Daigle-built, waterjet-powered 12-passenger launches in mid-February 2015 (see *TYMAC CREST* and *TYMAC WAVE* in the March 2015 issue of *Western Mariner*), and another pair of similar 36-ft waterjet-powered 12-passenger launches from Seattle's Kvichak Marine Industries in late February (see *In the Shipyards* in the March 2015 issue of *Western*

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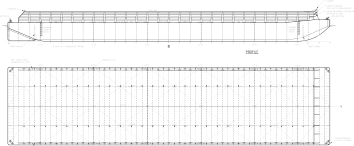
Waterfront Vancouver Harbour: Burrard Inlet, Dollarton and False Creek



Under construction since mid-2013, Richardson International's new 80,000 metric tonne grain storage facility on North Vancouver's working waterfront was nearing completion when Western Mariner swung past, with Amix Marine's heavy lift rig ARCTIC TUK (1980, Kambara Marine Development & Shipbuilding, Japan) on site to lift the various hopper components into place (for an in-depth look at the silo hopper installation process, check out <http://amixgroup.ca/in-depth-look-of-a-richardson-silo-hopper-lift/>). The Richardson Terminal is a major exporter of canola and cereal grains to countries along the Pacific Rim, and has been operating at maximum capacity for several years now. When the new storage facility goes into operation later this year the company expects to be able to handle in excess of five million tonnes annually.

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With the downtown skyline and the sails of Canada Place forming the quintessential Vancouver backdrop, the 80-ft, 3,100-hp SEASpan FALCON makes its way to the next job. The SEASpan FALCON and its sistership SEASpan HAWK were designed collaboratively by Robert Allan Ltd. and Seaspan in the early 1990s to meet Seaspan's requirements for a compact, powerful and manoeuvrable shipdocking tug that was suitable for operations in Vancouver harbour, while still being heavy and full-bodied enough to provide service in the more exposed waters off Roberts Bank. The design led to the OCEAN INTREPID, the first of a new ASD 24/50 class that was built in large numbers in South America. Built in 1993 by Vancouver Shipyards, the SEASpan FALCON develops 40 tons of bollard pull with twin MTU 12V 4000 diesels and Niigata Z-Pellar drives turning four-bladed 76-inch propellers.



Berthed at the renamed GCT Vanterm container terminal (formerly TSI Vanterm) is Evergreen Marine's 6,332 TEU, 300m (984-ft) containership EVER EXCEL (ex HATSU EXCEL, 2002, MHI Kobe Shipyard & Machinery Works, Japan). Port Metro Vancouver has four container terminals, with two of them — GCT Vanterm and DP World Centerm — located within Vancouver Harbour



(the other two are GCT Deltaport in Delta and Fraser Surrey Docks in Surrey). Headquartered in Vancouver, GCT (Global Container Terminals Inc.) also operates the former New York Container Terminal on Staten Island and the former Global Terminal & Container Services facility in Bayonne, New Jersey. The 31-hectare Vanterm site offers two container berths along its 619m (2,030-ft) quay, with six gantry cranes, a 10,332 TEU capacity container yard, nine intermodal tracks and an additional conventional berth. Immediately to the west, DP World's Centerm facility has similar capacity, with two berths and six gantry cranes serving a 31.3 hectare site. The Centerm site made the news shortly after Western Mariner visited when a fire broke out in a container full of the disinfectant chemical trichloroisocyanuric acid, creating a large cloud of toxic fumes and forcing some areas near downtown to be temporarily evacuated.



Deep sea ship crews can spend months at a time away from home, and The Mission to Seafarers offers a global network of over 260 centres that provide not just a friendly place where seafarers can stop and relax, but also provide administrative, social, communications, legal and spiritual support for seafarers.

Pictured here at Vancouver's Flying Angel Seafarers Club are Filipino messman Angerico Rivera (at left) and deck cadet Anthony Cardel from the containership CONTI BASEL, which was in Vancouver for a three-day stopover. The Mission to

Seafarers Vancouver operates two mission houses, one in Vancouver and one in Deltaport. The isolated Deltaport mission saw 13,300 visitors last year, while the more centrally-located Vancouver mission still logged over 4,000 visitors despite all the nearby big-city attractions.

Standing in front of the Vancouver's Flying Angel Seafarers Club is senior port chaplain Nick Parker, who has been with the mission for just over seven years following a career that started in the Royal Canadian Navy and later saw him working as a cleric in the dioceses of Caribou and New Westminster. "Vancouver is a privileged port," he notes. "Our strong regulatory framework and oversight mean we have fewer issues than in the old days, especially compared to some other ports." But while serious problems with unsafe ships or unpaid crew may be rarer these days, technological advances that see smaller crews working with reduced stopovers mean that the need for the missions is as real as ever. "In the broadest context, we look after the welfare of the seafarers," says Parker.



Waterfront Vancouver Harbour: Burrard Inlet, Dollarton and False Creek



Docked at Canfisco's head office at the foot of Gore Avenue in Vancouver are (left to right) the ROYAL CITY (1963, Star Shipyard/Mercers), CAPE GEORGE (ex WESTERN HUNTER, 1979, Shore Boat Builders), GEORGE MCKAY (1971, Matsumoto Shipyards) and CAPE SPRUCE (ex SUMMER HAWK, 1987, Shore Boat Builders). The Canadian Fishing Company, which was first established in 1906 and incorporated in 1908, built the home plant cannery at this location back in 1918. Purchased by the Jim Pattison Group of Companies in 1984, Canfisco took over BC Packers in 2000, doubling the size of the company to become the largest packer of canned salmon in Canada, selling under the Gold Seal and Oceans brands. In addition to the 45 million pounds of salmon the company processes and sells annually, it also harvests, processes and markets herring, blackcod, hake and halibut. When Western Mariner stopped by the docks were relatively empty, with a portion of the fleet out for the Gulf roe herring fishery.



Running at speed through the First Narrows is the Vancouver Police Marine Unit's patrol boat R.G. McBEATH, named in honour of Cst. Robert Gordon McBeath who was killed in the line of duty on October 10, 1922. The 33-foot Eaglecraft was built in 2008 by Daigle Welding & Marine, powered by twin Volvo D6 330-hp drive packages for a top speed of 38.8 knots at 3,575 rpm and a fully-laden cruising speed of 32.5 knots at 3,100 rpm. It's the latest in a line of patrol boats that go all the way back to 1911 when the force first started marine patrols. Unfortunately, budgetary concerns are now threatening the Marine Unit with significant cutbacks. In November 2014 police chief Jim Chu announced that in order to operate within the force's \$221-million budget, it would need to cut sworn positions in its canine, major crimes, crime scene investigation and marine units, with the latter losing seven positions and suffering cutbacks in its equipment budget. Vancouver isn't the only city suffering from budgetary woes on the waterfront: In October 2014 the Victoria Police Department announced that rather than replace its 1990s-era police boats MIKE 1 and MIKE 2, it will be decommissioning the boats and disbanding its marine unit, relying instead on the fire department, RCMP, RCM-SAR and Victoria Harbour Master for marine assistance.

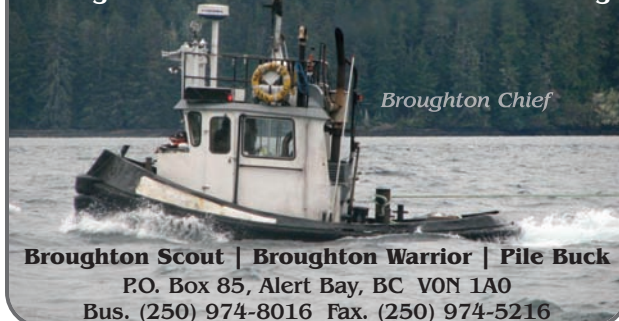


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Docked at Vanterm's eastern conventional berth is Tokyo Marine's chemical tanker AMAGI GALAXY (2010, Shin Kurushima Hiroshima Dockyard, Japan) being fuelled up by Petrobulk's fuel barge PETROBULKER (2011, Vancouver Shipyards). Marine Petrobulk is part of the Washington Marine Group and has been in operation since 1980, supplying fuel of all grades to vessels entering the ports of Vancouver,

New Westminster, Victoria, Prince Rupert, Kitimat and Nanaimo. It operates a fleet of three double-hulled bunker barges, each with a 4,500 metric tonne capacity.

Docked at Smit Marine Canada's facility east of Vanterm after getting its Canadian registration and undergoing some inspection and maintenance work is the company's recently-arrived ASD shipdocking and escort tug SMIT VENTA (ex SMIT DOMINICA, 2009, Damen Shipyards, Galati, Romania). The 28.7 m (94-ft) Damen 2810 design tug is fitted with twin Caterpillar 3516B diesels producing 3,678kW (5,000 hp) total power and driving Rolls Royce thrusters for an estimated 65-ton bollard pull. The SMIT VENTA arrived on the West Coast from Brazil in December 2014 after a 37-day voyage



and departed for service in the company's Prince Rupert fleet shortly after this photo was taken. A couple of months prior to the SMIT VENTA's arrival, the sistership SMIT SABA arrived from Panama following a 21-day voyage and was put into the company's Vancouver fleet. The pair is part of Smit's ongoing harbour towage fleet renewal, which includes a pair of new tugs being built by ABD Boats (see page 53).

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Waterfront Vancouver Harbour: Burrard Inlet, Dollarton and False Creek



Berthed at Lynnterm East is Marine Ace's 22,863 grt bulk carrier LA BAMBA (2012, Onomichi Dockyard, Japan) with Amix Marine's barges STRAITS COLD DECKER (1957, Burrard Drydock) and Z.B. 1801 (1979, Zidell Dismantling, Tacoma) offloading steel beams directly for transshipment. With 59 hectares of yard space, eight warehouses totalling 876,000 sq ft, paved outdoor storage, and a wide variety of specialized cargo-handling equipment (including container stuffing and de-stuffing facilities), Lynnterm is the region's major consolidation centre for forest products, steel and break-bulk, handling over 12 million tonnes of cargo annually.



Founded in 1913 and still family owned and operated, Vancouver Pile Driving is one of the largest marine general contractors in Canada. From its home base in North Vancouver nestled between Lynnterm West Gate and Lynnterm East Gate, the company operates a large fleet of marine derricks, scows, workboats and cranes (rated up to 350 tons), and specializes in marine construction (including precast concrete construction), pile driving, dredging, slope protection, densification, concrete floats, underwater installations and environmental remediation. Tied up to the company docks in this photo are VPD's derrick DELCAT No.2 (ex DILLINGHAM No.2, 1963, Allied Shipbuilders) with VPD towing provider Gisbourne Marine Services' 48-ft, 850-hp BLACK HAWK II (ex NORTH ARM VENTURE, built in 1970 by John Manly Ltd. to a Cove Hatfield-design) and 42-ft, 800-hp RAIDER (ex FOREST MARINER, ex SQUAMISH ROGUE, 1972, Vito Steel Boat & Barge).

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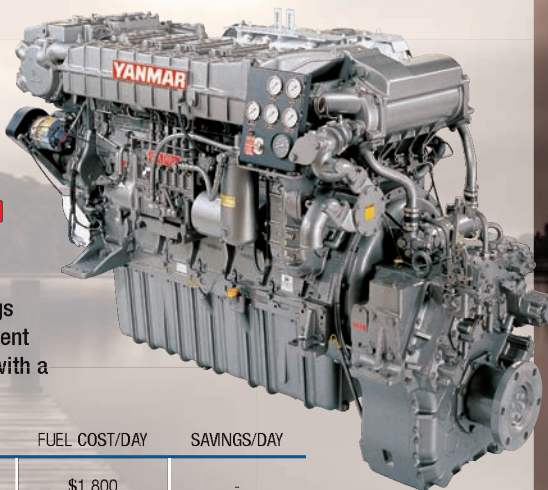


Immediately after launching the 104-ft aluminum fishpacker AMARISSA JOYE in September 2014, the crew at ABD Boats started work on hull 372, a 71-ft A.G. McIlwain-designed steel-hulled tug for Smit Marine Canada. When *Western Mariner* visited in early March, work was ticking along and the tug's hull was pretty much complete, with the twin 2,685-hp MTU 16V4000 engines and the upper assemblies of the Rolls-Royce Marine US 205 FP ASD thrusters installed (though the drives themselves weren't yet bolted on), and the two John Deere 4045 DFM 40 kW gensets also in place. In the left-hand photo of the tug, welder Renato Villa (shown standing on the left in the other photo, together with welder/fabricator Johnson Ramos) is gouging the chine welds prior to final full-penetration welding and ultrasound leak testing. In the meantime, ABD was gearing up to begin construction of the tug's aluminum superstructure while awaiting delivery of the hydraulics and rubber.



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Waterfront Vancouver Harbour: Burrard Inlet, Dollarton and False Creek

Over at Allied Shipbuilders the crew has been keeping plenty busy lately with a steady stream of repair and refit business.

Shown here in the smaller of the yard's two floating drydocks is North Arm Transportation's 51-ft, 1,000-hp Cove-Hatfield designed NORTH ARM PROWLER (1973, John Manly Ltd.), which was in for its four-year inspection and refit including replacement of its MTU Series 60 diesels, replacement of a generator, hull and superstructure repairs, work on the fenders, renewal of the accommodation floor coverings, and paint. Replacing the engines involved cutting an access opening on the vessel's starboard side, and meanwhile in this photo, hull plating repairs were underway on the portside bow. In Allied's larger drydock, the 142-foot, 5,750-hp SEASPAN COMMODORE was in for its intermediate refit.






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DOLLARTON AND CENTRAL HARBOUR



At Cates Park in Dollarton the industry-funded Western Canadian Marine Response Corporation (WCMRC, formerly Burrard Clean Operations) prepares to deploy a self-inflating skimming boom as part of an equipment deployment exercise. As a Transport Canada certified response

organization, WCMRC's mandate is to ensure there's a state of preparedness in place to mitigate any wildlife, economic and environmental impacts when an oil spill occurs, and to ensure the safety of both the public and responders. As part of this mandate, every year the WCMRC trains over 100 contractor personnel and 200 fishermen's oil spill emergency team members in exercises and drills. As well, the WCMRC field tests specific Geographic Response Strategies designed to protect sensitive natural and cultural features and reduce decision-making time in the event of an actual spill.



WCMRC's response vessels BURRARD CLEANER NO.8 (1990, Shore Boat Builders) and M.J. GREEN (2012, Rozema Boat Works, Mount Vernon, Washington) race towards the Cates Park equipment deployment exercise, with Chevron Canada's Burnaby Refinery in background. The twin-screw 720-hp BURRARD CLEANER NO.8 has a top speed of 18 kts and a capacity of 2.3 tons of recovered oil, while the twin-screw 1,000-hp M.J. GREEN has a 25-kt top speed and a storage capacity of 10 tons with a skimming capacity of 32.8 tons per hour.

WCMRC's response boom boat BURRARD CLEANER No.7 (1990, Raider Aluminum, Surrey) awaits the action at the Cates Park dock. Boom boats don't have skimming or recovered oil storage capacity, but with twin Yamaha outboards the BURRARD CLEANER No.7 can travel to an incident site at a top speed of 30 knots. WCMRC responds to an average of 20 incidents annually along 27,000 km of BC coastline, using a fleet of 28 response vessels and 50 response trailers located throughout BC. The organization currently has a new 70-foot, 1,600-hp Ocean Class response vessel, the G.M. PENMAN, under construction by Rozema Boat Works, with delivery slated for summer 2015 (see *In the Shipyards* in the March 2015 issue of *Western Mariner*).



Chevron Legacy in Coal Harbour

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What was once a bustling shipbuilding centre in Dollarton is now history. Allied Shipbuilders vacated its Dollarton Shipyard (which was originally the Matsumoto Shipyard and is seen in the foreground of this photo) in August 2014, and McKenzie Barge & Marine Ways closed down its business (which occupied the now-empty land in the background) at about the same time. The owner of the two properties sold the land to Polygon Development for a proposed residential development, and by early 2015 the McKenzie Barge site was stripped bare and all that remained of the Dollarton Shipyard was the empty (and rapidly disappearing) shell of the shipbuilding shed. The closure of the two yards ends over 80 years of continuous marine business on the site — McKenzie Barge & Marine Ways was started by J.K. McKenzie in 1922 as McKenzie Barge & Derrick and a marine ways was installed at Dollarton in the early 1930s. Originally in Prince Rupert before WWII, Isamu “Sam” Matsumoto established his Dollarton shipyard in 1949.



Dredging the deep sea berth at the Canexus Chemicals plant in North Vancouver is a Vancouver Pile Driving rig, with the barge VPD 404 (ex SEASPAN 404, 1966, Yarrow) on hand to load the spoil. The Canexus plant, which was built in 1957, is a key supplier of chemicals used to purify municipal drinking water, including the Greater Vancouver Regional District water supply. Nearly two-thirds of the chlorine produced at the plant is used to treat drinking water or is repackaged for use in swimming pools and other applications where pure water is required. BC's forest industry is also a major user of the plant's products, and 84 percent of the plant's production of caustic soda is used in the pulp and paper industry. The raw materials used in the manufacturing process are common salt and water, with salt delivered from Guerrero Negro, Mexico via deep sea ship. In March 2014 NYK Bulk & Projects Carriers signed a 15-year contract with Baja Bulk Carriers (a joint venture between the Mexican government and Mitsubishi Corporation) for the charter of a new-build bulk carrier to replace the ISLA DE CEDROS, which completed 216 voyages between the two ports in continuous carriage. The new vessel, BUENA VENTURA, was built by Oshima Shipbuilding of Nagasaki, Japan and delivered in August 2014. The 209 m (686 ft) vessel can carry 62,915 metric tonnes of salt and has two mobile cranes rated at 750 tons/hour each, a belt conveyor, a boom conveyor, and a hopper.

Waterfront Vancouver Harbour: Burrard Inlet, Dollarton and False Creek

FALSE CREEK



While harbour cruise vessels, whale watching excursions and fish boats still bring some commercial marine traffic into Vancouver's False Creek, the only remaining industrial site in the creek is Ocean Concrete's Granville Island plant, supplied by a regular tug service bringing in barge-loads of aggregate from Sechelt. In this photo, Mercury Launch & Tug's 50-ft, 1,000-hp OCEAN GORDON (ex GULF REGENT, 1989, Summer Equipment, Vancouver) picks up the empty aggregates barge Evco No. 3 (1967, Bel-Aire Shipyard) for the run to Sechelt. As a holdout industrial use, Ocean Concrete has undertaken several initiatives to remain a good neighbour among the Granville Island's many tourist-oriented businesses. One recent initiative was to allow Brazilian street artist duo Os Gêmeos to transform the site's big grey aggregate silos into a massive work of public art representing six colourfully-clad figures. The duo are twin brothers from Sao Paulo (Os Gêmeos means "the twins" in Portuguese), and the Granville Island installation is their Canadian debut and biggest work to date. The mural, which was completed in September 2014 as part of Vancouver's Biennales 2014-2016 exhibition, cost \$125,000 and was partially funded through public crowd-funding.



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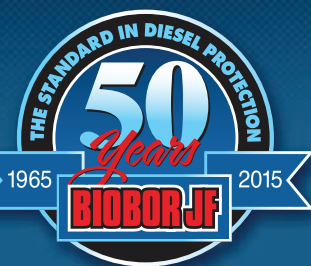


creosote used on the pilings, while providing enough texture for the eggs to adhere. By late February the wrapped pilings were all dense with herring roe (see inset photo), and the society expects to see at least the double the number of fish hatch this year. Pictured here is Fishermen's Wharf assistant harbour manager Mike Turkington with the harbour's information board explaining the project. ◀

Industry may be on the wane in False Creek, but herring is on the rebound thanks in large part to the efforts of John Matsen and the Squamish Streamkeepers Society. After a successful program to wrap pilings in Squamish, the society approached the False Creek Harbour Authority (which manages the Fishermen's Wharf docks) with a proposal to duplicate the effort in False Creek. The creek was chosen because it was historically an important herring spawning site before decades of industrial pollution destroyed the annual run. Following a successful initial pilot program that saw 10 pilings wrapped in late 2013 (and 20 million fish hatch), the Society returned to the creek in January 2015 to wrap an additional 49 pilings using textured Enviroliner, which provides a impermeable non-abrasive spawning medium that protects the herring roe from the



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WESTERN PORTS & TERMINALS

Switching at Port Metro Vancouver

Shunting railroad cars is a vital part of the Port's complex activities

BY FRED McCAGUE



PHOTO BY DAVID RAHN

The newly opened raised roadway in front of Vanterm allows trucks travelling to and from the Trans-Canada Highway to avoid ten level railroad crossings.

Riders on the West Coast Express commuter trains leaving Vancouver's Waterfront Station gaze out their windows to see what appear to be rows of hopper cars and double stack container cars stretching in a seemingly unbroken line east to the Iron Workers Memorial and Second Narrows Railway bridges. From there, the trip has more view, broken by west-bound trains and occasional sidings filled with tank cars, until the yellow sulphur pile of Pacific Coast Terminals

risers and more hoppers are on display. Finally, there is a more or less empty stretch of track until the train eases into the Canadian Pacific's (CP) car-filled Coquitlam yard and slows to a stop at Port Coquitlam station.

While the cars seem idle, in fact, they are constantly in motion, being loaded or unloaded and marshalled into trains that move east, and being replaced by newly arrived railcars.

This is the Canadian Pacific main line into Vancouver, the track completed in

1886 that helped create the city. It links three grain elevators, two container terminals, oil terminals and the bulk terminal at Port Moody. Each of the terminals has its own on-dock rail tracks and each is heavily dependent on rail service.

This is only one piece of the complex network of railroad tracks that provide access to every corner of Port Metro Vancouver, a port that was formed by its railroads and is completely tied to them.

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The Second Narrows Railway Bridge viewed from North Vancouver. The single line emerges from a tunnel running beneath Vancouver and Burnaby, crosses the bridge spans and immediately branches on the North Shore side as track heads towards the Lynn Yard.

Vancouver, Canadian National (CN) and Canadian Pacific run all westbound trains along CN tracks, while all eastbound trains run on CP tracks.

In 2008, both railroads expanded on this by establishing an agreement to split switching duties.

The most surprising aspect is that under the agreement, preparations for switching and related work begins in the middle of the Fraser Canyon. Halfway between Kamloops and Vancouver at Boston Bar and its counterpart directly across the river North Bend, trains stop to change crews.

The Canadian Pacific investor book notes that under the switching agreement: "CP operates the trains of both railways using CP crews a distance of approximately 127 miles from Boston Bar to the terminals on the south shore of Burrard Inlet in Vancouver and return

to North Bend. CN operates trains of both railways using CN crews a distance of approximately 140 miles from Boston Bar to the terminals on the north shore of Burrard Inlet and return to North Bend."

With some exceptions, container trains to Deltaport and unit trains of coal, Westshore Terminals are operated by their respective CN and CP crews.

The directional running and switching agreements maximize railroad capacity to Port Metro Vancouver.

Salem Woodrow of CP says the railroad runs between 37 and 41 trains per day to or from the Vancouver area, most destined for the port. CN posts slightly lower numbers, mainly due to CP's coal traffic from the Kootenays.

To reach the South Shore, trains shift from CN to CP tracks on the north side of the Fraser via the Mission Bridge.

To reach North Vancouver, most trains continue on to the New Westminster Railway Bridge and then travel along the CN/BNSF (Burlington Northern Santa Fe) line through New Westminster and Burnaby. They branch off the line at Willingdon Ave. to reach a two mile (3.4 km)-long tunnel that ends at the Second Narrows Railway Bridge. From there trains move across the bridge to the big Lynn yard. At the other end of North Vancouver, southbound trains from the former BC Rail line cross the Capilano River to yards opposite Vancouver Wharves.

Service to Deltaport and Westshore Terminals has straightforward through-running along the Roberts Bank Rail Corridor which handles about 20 trains per day on a very complex track structure. Westbound trains on CN tracks leave the main line at 240th St. in



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WESTERN PORTS & TERMINALS



PHOTO BY DAVID RAIN

A view of the huge Lynn Yard in North Vancouver.

Langley, travel two miles down a CN spur to 232nd near Highway 1. There the trains enter along an eight mile stretch of track owned by CP, but not directly linked to any other CP track, that takes them to Cloverdale.

At Cloverdale, the track becomes British Columbia Railway's Port

Subdivision for the 24 miles (37 km) of mainline track to Deltaport and Westshore Terminals at Roberts Bank. BNSF coal trains join the line near the Surrey - Delta border.

The Port Subdivision is the final piece of track still owned by BC Rail. It was built in 1970 by the BC government to provide

access to what was dubbed the Roberts Bank superport and control was later passed on to BC Rail, but the railroad never operated any trains on the tracks.

Today, as Gordon Westlake, president of BCR explains, it remains "infrastructure only," adding, "CN, CP and BNSF have running rights."

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Part of the Low Level Road project in North Vancouver, the new overpass near the Third Street merger intersection allows employees and visitors to access the Neptune coal terminal and two grain elevators while avoiding level train crossings. The smoke in the background is the initial stage of a four-alarm container fire at Centerm that occurred on March 4 2015 and took Vancouver firefighters and Haz-Mat crews several hours to extinguish.

At Westshore Terminals, unit trains remain coupled together as they enter the terminal's circular tracks. Coal cars are dumped while still coupled to the train.

Deltaport loads and unloads double stack container cars from both CN and CP, with trains assembled in the railroad's adjacent Gulf Yard.

All three routes have become

extremely busy and have been nearing capacity in some areas. The advent of longer trains - some container trains are now well over 10,000 feet long - requires longer track space and sidings with



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fewer crossings, while automobile and truck traffic feels the impact of slower moving trains.

Port Metro Vancouver, the provincial, federal and municipal governments, railroads and terminals have invested more than \$700 million in improvements over the past few years.

John Parker-Jervis of Port Metro Vancouver terms this “generational investments in infrastructure for the Pacific Gateway.” He says, “Demand for Canadian trade is increasing, and Port Metro Vancouver is growing as a result. We are improving infrastructure to facilitate the needs of the growing local and national economy, while minimizing the impact of port operations on local communities.”

The recently opened Low Level Road in North Vancouver shifted the road higher up the hillside. The old roadbed will soon be used to add two more long tracks to handle more and longer trains. The project also incorporates a new overpass to provide access for workers at Neptune Terminals and two grain elevators.

An overpass is currently under construction at Philips Avenue in North Vancouver to provide worker access to Seaspan, Fibreco, Vancouver Wharves and others.

In Vancouver, an extensive raised roadway in front of Vanterm lifted car and truck traffic above ten level crossings for tracks leading into Vanterm and Pacific Elevator. On Powell Street a new overpass opened last summer.

In Delta, Surrey and Langley a total of ten overpasses, under two programs, have been completed over the past few years to eliminate a number of level crossings on busy roads.

In addition, SRY Rail Link (Southern Railway) provides switching services to Annacis Island, including the big Wallenius Wilhelmsen Logistics Annacis car terminal and SRY's own barge ramp for railcars destined for Vancouver Island. SRY estimates almost half of the 65,000 cars the short line railroad handles each year move through Annacis Island. In addition, more are switched into Catalyst Paper's distribu-

tion centre and Fraser Surrey Docks in Surrey.

CN has branch lines in Richmond that serve both Fraser Wharves and the port's Richmond Properties, a site that includes extensive import and export container traffic through the large distribution centres located there.

Overall, Port Metro Vancouver encompasses 26 bulk, container and grain terminals geared for deepsea shipping. All have their own on-dock trackage and many have their own locomotives to handle shunting duties at the terminals. All rely on regular switches by railroads.

The vast majority of the 140 million tonnes of cargo that moved through Port Metro Vancouver last year moved by rail. Without the railroads, the port would not exist. And without the port, the city would never have developed into today's vibrant metropolitan region. ◀



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Business on the Move



Mike Fitzpatrick new President of Robert Allan Ltd.

The Board of Directors of Robert Allan Ltd. reluctantly accepted notice from Ken Harford, P. Eng. of his intention to retire in June, 2016 after eight years leading Robert Allan Ltd.

"Having completed the ownership transition from Rob Allan and his family to a group of senior managers

and subsequently involving a further group of dedicated employees in the company ownership, it is time to pass the helm to the next generation," Harford said.

The Board of Directors extended its sincere gratitude to Ken for managing the company through this challenging process

and has appointed Mike Fitzpatrick as the new president. Ken Harford will remain as a managing director during this succession process.

Mike Fitzpatrick joined the company in 2003, was a key member of the initial employee ownership group, and has been a driving force in the company's growth. Mike will be supported in his new role by Senior Vice President Rollie Webb. In a statement to shareholders, Fitzpatrick said "I am honoured to be offered this opportunity to help lead Robert Allan Ltd. into the future. If I retire at the age of 66, it will be the 100th anniversary of this incredible company that Rob's grandfather started in 1930. One of you will be sitting in the President's chair when this occurs but my goal for the coming years will be to ensure the company is even stronger on its 100th anniversary than it is now." RAL

Keel laid on first of two Canadian-built LNG ferries

Davie Shipbuilding in Lauzon, Quebec, held a ceremony last month to celebrate the keel-laying and beginning of the hull assembly on the MV ARMAND-IMBEAU II, the first of two LNG-powered sister ships to be built for the Société des traversiers du Québec. ARMAND-IMBEAU II will be the first LNG-powered ferry to be built in North America.

The two ferries will run on the Tadoussac-Baie-Sainte-Catherine route, and are designed with ice-class hulls for year-

round navigation on the Saguenay Fjord. Measuring 92 m in length, each vessel will include eight vehicle lanes on two decks, enabling the transport of up to 110 vehicles.

The MV ARMAND-IMBEAU II is scheduled for delivery in the autumn of 2015, followed by the MV JOS-DESCHÊNES II, four months later. *Kristin Baldwin, Canadian Ferry Operators Association*

Helicopter Express Service Starts in Nanaimo

On March 11 Helijet International began a new harbour-to-harbour helicopter passenger service between downtown Nanaimo and downtown Vancouver. Travel time is 18 minutes and Helijet's 12-passenger, twin-engine, two-pilot Sikorsky helicopters are equipped to operate both in daylight and after dark, and are capable of offering 14 scheduled flights (seven return flights) weekdays between 7:00 a.m. and 7:00 p.m. Flights will operate between the heliport in downtown Vancouver, and Helijet's Nanaimo Harbour Heliport at the Cruise Ship Welcome Centre. Complimentary vehicle parking, downtown shuttle service, taxi and rental car services will be available at both check-in terminals.

"Helijet is able to take off and land pre-dawn and after sunset, which allows us to offer a wide range of flight times each day [which] reduces the trip to little more than a short hop,"



Passengers board at Nanaimo Harbour Heliport at the Cruise Ship Welcome Centre.

said Danny Sitnam, President and CEO of Helijet, The company is offering an introductory fare of \$109 one-way, including taxes. Regular fare will be \$129.

"The Nanaimo Port Authority is pleased Helijet is ready to begin its service to and from the port's Nanaimo Cruise Ship terminal", said Bernie Dumas, President & CEO of the Nanaimo Port Authority "This new link between the central Island and the Lower Mainland provides more choice and is a positive addition to our local business community." D.R.

PHOTO COURTESY HELIJET INTERNATIONAL

FortisBC Signs 10-Year Contract to Supply Liquefied Natural Gas for BC Ferries' New Intermediate Class Vessels

BC Ferries and FortisBC have entered into a long-term contract to secure liquefied natural gas (LNG) to fuel the three new dual fuel (diesel/liquefied natural gas) intermediate class vessels under construction at Remontowa Shipbuilding S.A. in Gdansk, Poland. These ships will operate in the Southern Gulf Islands and on the Powell River to Comox route with the first ship scheduled to enter service in late 2016, the second by early 2017 and the third by mid-2017. When all three are in service, FortisBC will be supplying them with approximately 300,000 gigajoules of LNG per year.

FortisBC has plants at both Tilbury in Delta and Mt. Hayes near Nanaimo and will supply LNG fuel to the ships with trucks making deliveries to the vessels during non-operational periods. FortisBC also provided BC Ferries with \$6 million in incentive funding for the new vessels to help offset incremental capital costs associated with the use of liquefied natural gas.

Two of the new ships will replace the 50-year old *QUEEN OF BURNABY*, which sails between Comox and Powell River and the 51-year old *QUEEN OF NANAIMO*, which services the Tsawwassen – Southern Gulf Islands route. The third vessel will augment peak

and shoulder season service on the Southern Gulf Islands route and provide refit relief throughout the fleet. Each of the new 107 m vessels will accommodate 145 vehicles and 600 passengers.

Last year, BC Ferries spent \$126 million on fuel. Even with the current drop in diesel oil prices, BC Ferries expects to realize significant savings by operating vessels on LNG, which will help with fare affordability.

In addition, the BC Ferries Commissioner has approved conversion of BC Ferries' two largest vessels, the *SPIRIT OF VANCOUVER ISLAND* and the *SPIRIT OF BRITISH COLUMBIA*, to dual fuel as well as mid-life upgrades for the two vessels. Converting these ships to LNG is expected to reduce their fuel cost by approximately 50 percent.

The *SPIRIT OF VANCOUVER ISLAND*'s LNG conversion and mid-life upgrade is planned from the fall of 2016 through the spring of 2017. The *SPIRIT OF BRITISH COLUMBIA* project is planned for the fall of 2017 through the spring of 2018. In total, BC Ferries expects to be operating five vessels on LNG by 2018. See also *Liquefied Natural Gas: Marine Fuel Coming to the BC Coast* on page 19 in this issue. D.R. ◀

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LEGAL NET

Federal Court Upholds Exclusion of Liability Clause in Boat-Handling Contract

BY GRAHAM WALKER AND DIONYSIOS ROSSI

The recent Federal Court decision of *Capitaines Propriétaires de la Gaspésie (A.C.P.G.) Inc. v. Pêcheries Guy Laflamme Inc.*, 2014 FC 456, highlights the importance of knowing the legal “fine print” in maritime contracts before entering into a commercial agreement, and the need to maintain adequate insurance coverage on a vessel at all times.

The case involved the fishing vessel MYRANA I, which was damaged while being launched from dry dock by a portal crane, in Rivière-au-Renard, Quebec.

A mechanical problem occurred with the portal crane, causing its chain to

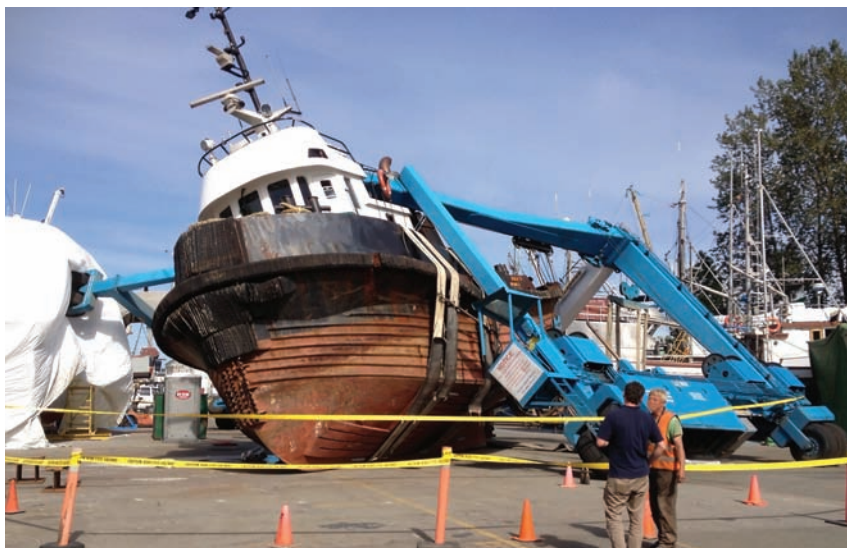


PHOTO BY BARB HOWE

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| 3% | Regular Risk | 73% | 0.81% | \$1,620 |
| 1.75% | "A-1" Class Risk - Trawler | 56% | 0.77% | \$1,540 |
| 3.5% | Regular Risk - Trawler | 76% | 0.84% | \$1,680 |

Note: All categories are subject to a minimum “net” premium of \$650. “Refunds” and “Net rates” will fluctuate from year to year based upon the company’s performance. Non-refundable rate categories receive no refund.

Optional Coverages:

| GROSS RATE | CATEGORY | REFUND | NET RATE | NET PREMIUM |
|------------|---------------------------------------------------------------------------------------------------------------------------------|--------|----------|-------------|
| 2% | Ancillary Vessel (Eg.- \$50,000 value) <i>*Note: subject to a minimum “net” annual premium of \$650</i> | 25%* | 1.50% | \$750 |
| 2% | Power Skiff (Eg.- \$50,000 value) <i>*Note: Premiums withheld 5 years in Power Skiff Category</i> | 75%* | 0.50% | \$250 |
| 0.3% | Cargo (Eg.- \$100,000 value) <i>*Note: Cargo policies are subject to a minimum premium of \$250 and no refunds are paid.</i> | n/a | 0.30%* | \$300 |

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break and the vessel to fall into the water. 800 feet of cable from the crane then fell onto the vessel, which sustained significant damage as a result.

Not surprisingly, the owner of the vessel, Pêcheries Guy Laflamme Inc. ("Pêcheries"), demanded compensation in the amount of \$552,181.07 in respect of the damage sustained by the vessel, from the owner and operator of the portal crane, Capitaines Propriétaires de la Gaspésie (A.C.P.G.) Inc. ("Capitaines"). In

response, Capitaines, together with its insurer, Axa Assurances Inc. ("Axa"), as well as the Capitaines employee who was operating the crane at the time of the incident, Paulin Cotton, all denied liability on the basis of an exclusion of liability clause in the boat-handling contract between Capitaines and Pêcheries.

The wording of the exclusion clause provided that the vessel owner "... declare that I accept liability for any risk resulting from the towage, docking, wintering and/or launching of this vessel, and I release the Owner of this dry dock and its Operator [...] from any civil liability resulting from these associated operations or handling."

Capitaines, Axa, and Mr. Cotton sought a declaratory judgment from the Federal Court that they were not liable for any damage to the vessel, due to the existence of the exclusion of liability clause. In response, Pêcheries brought a counterclaim against Capitaines and its insurance company, in respect of the damage sustained by the vessel.

The Federal Court granted a declaratory judgment holding that Capitaines, Axa, and Mr. Cotton were not liable to Pêcheries for any damages arising from the incident, due to the exclusion of liability clause.

In upholding the exclusion of liability clause, the Federal Court held that the

all denied liability on the basis of an exclusion of liability clause in the boat-handling contract

clause was broad enough to exclude liability even in the case of negligence by Capitaines and Mr. Cotton. The Federal Court noted that Canadian courts have increasingly distanced themselves from the presumption that it would be unreasonable for one party to a contract to waive its right to commence a legal action for harm caused by the negligence of the other party.

The Federal Court dismissed the argument of Pêcheries' representative, Guy Laflamme, that he was unaware of the exclusion clause at the time that the parties entered into the contract, due to the fact that he had difficulty reading. The court noted that, after the incident, Pêcheries had located a total of 36 Capitaines boat-handling contracts in its company files, at least 16 of which were signed by Mr. Laflamme. The court further noted that Pêcheries continued to do business with Capitaines after the incident occurred, and that Mr. Laflamme had continued to sign the same contract despite knowing of the

exclusion clause. For all of these reasons, the court concluded that Mr. Laflamme (and therefore Pêcheries) knew or should have known of the existence of the exclusion clause in the boat-handling contract before the incident occurred.

Lastly, the court held that the exclusion clause was not unfair because it was open to Pêcheries, upon being confronted with the clause, to take out hull and machinery insurance in respect of the risk of damage to the vessel

during launch operations. In this regard, Pêcheries admitted that while it had earlier taken out hull and machinery insurance on the vessel, its policy had been cancelled the year before because Pêcheries representatives forgot to pay the premium.

Taken together, the failure of Pêcheries to fully understand the terms and conditions of its boat-handling contract and to maintain adequate insurance coverage on the vessel during launch operations, resulted in a very costly lesson, despite the fact that it did not actually cause the damage to its vessel. Accordingly, the case serves as an important reminder of the need to know how particular risks are allocated in a maritime contract, and the need to take prudent steps to reduce those risks. ◀

Graham Walker and Dionysios Rossi practice maritime law at the Vancouver office of Borden Ladner Gervais LLP.

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Fishing Safety, a Shared Responsibility

BY GLENN BUDDEN

Early on the morning of May 18, 2013, the small lobster-fishing vessel *MARIE J* was returning to its home berth of McEachern's Point Harbour, New Brunswick. An initial foray to the Gulf of St. Lawrence had been cut short by bad weather, and as the vessel transited the narrow channel marking the return passage into Tabusintac Bay, it grounded on a nearby unmarked sandbar. Pounded by 3m to 4m waves driven by northeast winds of 25 knots, the vessel was soon pushed off the sandbar and sank.

Although the master aboard another vessel in the area contacted the 911 call centre, all three persons aboard the *MARIE J* drowned—including two who were at one point seen standing on the starboard side bulwark and holding on to the wheelhouse, neither wearing a Personal Floatation Device (PFD) [TSB Investigation Report M09Z0001].



PHOTO COURTESY TRANSPORTATION SAFETY BOARD OF CANADA.

Regardless of whether they live in Atlantic Canada or British Columbia, fishermen know that theirs is not a profession without risks. The Transportation Safety Board of Canada (TSB) knows it, too. In 2010, we put the issue of Fishing Vessel Safety on our Safety Watchlist, which identifies the greatest risk to Canada's transportation system. Then, in 2012, we published a report [TSB Investigation Report M09Z0001] that identified 10 recurrent fishing safety issues—half of which were present to some degree in the tragedy of the *MARIE J*:

- **Lifesaving appliances:** Fishermen may resist wearing PFDs, choose

not to carry immersion suits, carry only equipment necessary for minimum compliance with regulations, or choose not to carry an automated emergency position-indicating radio beacon (EPIRB) or liferaft;

- **Fisheries resource management:** Competing for their share of a limited resource may encourage fishermen to take risks such as operating in poor weather;

- **Regulatory approach to safety:** Some provinces have workers' compensation board policies that are tailored specifically to fishermen, while fishermen in other provinces have

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no workers' coverage at all;

- **Training:** Some fishermen assess and manage risk based only on their own experience; and
- **Safe work practices:** Some fishermen learn and reinforce their operating practices based only on experience and exchanges with peers, instead of sanctioned education and awareness programs.

Perhaps the key finding of the TSB's 2012 report on fishing safety, however, was to point out the complex interdependence of these issues, with each affecting the others in different ways. The same holds true for any solutions. Trying to fix each issue on its own simply doesn't work. They need to be addressed *together*.

Last November, when releasing its investigation report into the MARIE J, the TSB drew specific attention to this idea, but acknowledged that solutions vary from province to province. In Nova Scotia, for example, that province's Fisheries Safety Association, along with the Nova Scotia Fisheries Sector Council,

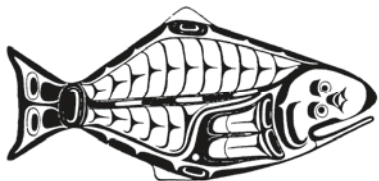
works in partnership with the fishing community to further safety, a coordinated effort that is helping fishermen realize safety is a vital part of fishing operations. By comparison, initiatives in New Brunswick are limited, since Worksafe NB lacks the legislation to enforce matters related to occupational health and safety on fishing vessels. Nor, unfortunately, are there provincial-level fishing safety organizations working to promote safe work practices among fishermen.

In British Columbia, meanwhile, the Fish Safe Advisory Committee, which is open to all members of the fishing community, has produced or helped to develop several programs and initiatives aimed at developing practical PFDs for fishermen, educating all members of the community about fishing in BC, improving stability education, and providing fishermen with safety manuals, familiarization and drill training. As well, Worksafe BC is proactive in fishing vessel safety and participates fully in the provincial initiatives, and develops, implements and enforces fishing-specific regulations.

That's a lot of good work that's being done across this country. But there's still a long way to go. Roughly one fisherman per month still dies in fishing-related activities, and that number hasn't changed much over the past five years. Many still don't wear their PFDs, and short fishing seasons — regardless of province or fishery — mean some fishermen continue to feel pressured to venture out in bad weather.

It is hoped that tragedies like the MARIE J will spur people to action, because there needs to be concerted and coordinated action by federal and provincial authorities and by leaders in the fishing community. Until that happens, though, the TSB will continue to push for change — by investigating accidents, making recommendations, and communicating what we learn — so that more and more fishermen make it safely home to port. ◀

Glenn Budden is a Senior Marine Investigator in the Pacific Region with the Transportation Safety Board of Canada.



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QUIZ 124

Time and Tide wait for no man ... even if the 2015 tide book is in metres

BABE THE SAFETY POOCH
There is a metres to feet
conversion table at the back
of our tide book.

BY CAPT. BARB HOWE

Tide books are trending now. Canadian Hydrographic Service (CHS) recently circulated an email asking the marine community at large for input about the 2015 tide books being only in metres - should the 2016 tables include feet again, they queried.

Up until the 2015 tide books, to calculate a height at a specified time or time at a specified height solution, the interpolation tables required us to work in feet even though the tables gave heights in both feet and metres. I trotted over to Wolff Marine and had a gander at a 2015 tide book. No Imperial units and the interpolation tables are metric. They told me that a lot of people are grumbling about the metric format. And that's not all.

In addition to the metres/feet matter there is a low groundswell of folks who would like to see the CHS tide books "corrected" for daylight savings time. Corrected is the wrong word as there is nothing incorrect about standard time. I had a conversation with a colleague about this and he strongly defended his position as a safety issue. If people are unsure what to do with book time after they've sprung forward they might transit a tricky narrows an hour off from slack and get into trouble.

CHS explains that the printed tide tables must predict in

standard time as they are used by commercial mariners keeping Zulu time when transiting Canadian waters. They also noted that official tide predictions of all countries are on standard time. However, with a click of the mouse, the weekly predictions on the CHS website can be changed to display daylight savings time.

We use units of measure to explore and make sense of our world. Often, for common understanding, units aren't even designated. For length some might say "it's about a football field", and many of us have a good visual on a "net length". For direction we might say "it's at about 2 o'clock". Impressively, I can see 100 grams – easy, it's a decent deli sandwich. So in part the metres/feet discussion is about how we see things.


I see a four-foot under-keel clearance as dodgy. I can't see 12 decimeters, worse yet it even sounds a bit optimistic. So I say reinstate the feet column in the CHS Tide Tables, and leave the predictions in standard time.

Some Secondary Ports have height and time differences that must be added or subtracted from the times and heights of a Reference Port. This month let's try to identify which Reference Port these Secondary Ports are referenced on. For example, the Secondary Port White Rock is referenced on Point Atkinson.

1. Deep Cove is referenced on?
2. Gibsons is referenced on?
3. Maple Bay is referenced on?
4. Esquimalt is referenced on?
5. Juskatla (Haida Gwaii) is referenced on?
6. Masset is referenced on?
7. Bute Inlet is referenced on?
8. Point No Point is referenced on?
9. Bellingham (Washington) is referenced on?
10. Comox is referenced on?

Answers on page 82





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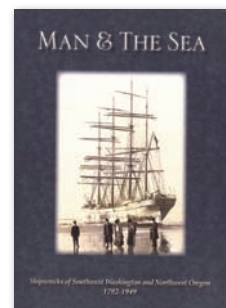
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IN THE SHIPYARDS

COMPILED BY ROB MORRIS

Meridian Marine Industries

Alongside at Meridian's Fraser River North Arm docks were two 80m x 22m heavy-duty deck cargo barges built for Ledcor Resources and Transportation, Marine Division (Vancouver) by the Nantong Minde shipyard in Nantong, China, to the Skeena 5500 design of Capilano Maritime Design (North Vancouver). The trans-Pacific tow of the LEDCOR L6001 and LEDCOR L6002 was completed in late February '15 by the Foss Maritime tug SIDNEY FOSS. The towing gear was being removed, the ballast water was tested and pumped from the centre tanks, and the installation of stern-quarter fendering and application of coatings was completed. Also delivered from China as deck cargo on the LEDCOR L6001 was the STORM TITAN (photo on page 74), a 16.76m x 5.94m Damen Stan 1606 design twin-screw (Caterpillar C18 TA diesels; total



PHOTO BY ROBERT FITCHELL

1,216 bhp) tug built for Ledcor by Damen Shipyards Changde in Changde, China (see also *In the Shipyards*, WM's January 2015 issue). Still aboard the barge, the tug was receiving extra fendering and various work to prepare it for service.

Fabrication of gallery car decks for BC Ferries' (BCF) QUEEN OF CAPILANO continued. Most of the midships deck sections had been shipped for installation by Esquimalt Dry Dock Co which is prime contractor for the ferry's mid-life refit at the Esquimalt Graving Dock. Fabrication was nearing completion on sectional steel pontoon dock (designed by Capilano Maritime Design) for a tailings pond in northern Alberta. A different pontoon design with pumps and stainless steel piping is being fabricated for Glencore Corp.



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IN THE SHIPYARDS

PHOTO BY DAVID CONN



In the first week of March design and lofting were complete and steel cutting was beginning for a 28-metre barge-like tidal power electrical generation vessel for Water Wall Turbine (Lion's Bay BC). The vessel will house a 500 kW turbine designed to provide low-cost power to the Dent Island Lodge on Stuart Island (see also *In the Shipyards*, January 2015).

The Meridian mobile crews carried out piping and steel upgrades on BC Ferries' SPIRIT OF BRITISH COLUMBIA at the BCF Fleet Maintenance facility (Deas Dock) in Richmond, as well as miscellaneous barge work for Catalyst Paper and lifeboat davit repairs and cargo crane load testing on the

freighter MV FENELLA in Nanaimo BC. The Industrial Marine Training and Applied Research Centre (IMTARC), based in Esquimalt BC, has opened a classroom at Meridian Marine where First Nations students are receiving pre-apprenticeship training. A number of IMTARC program graduates already work at Meridian. *By David R. Conn*

Arrow Marine Services

Shearwater Marine's 120' x 30' landing barge, the CENTRAL COASTER ex ARCTIC KAPVIK ex KAP IV (built to a Robert Allan Ltd design for Kap Bros Transport in 1971-72 at Great West Steel, Edmonton) received a substantial upgrading at Arrow Marine through 2010 which, in the main, included installation of a new aluminum deckhouse and extensive hull steel rebuilding in the bow rake and the side-shell/chines sections from the main engine room bulkhead forward, plus new engine cooling piping above the chines (see *CENTRAL COASTER: Shearwater Marine's Proud Flagship* in WM, April 2011). Currently Arrow has under way the next major refurbishment and upgrade on the CENTRAL COASTER (photo opposite). It includes insertion of a new 30-ft hull/deck section forward of the stern section (photo opposite). The section has three feet more draft than the rest of the hull because it has been fabricated with a three-foot void below its centreline fuel tank to meet Transport Canada's proposed standards for double-hulling of single-hulled oil barges. The photo shows how the new section's bot-

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tom is shaped to fair into the chines and the section's aft end will be likewise faired into the hull bottom. The vessel's three existing centreline tanks in the 90-ft forward section will be similarly double-bottomed during this refit. The CENTRAL COASTER is also being repowered. The pair of 365-hp Detroit



12V-71 diesels and Twin Disc 514 gears is being replaced with a pair of 450-hp 13-litre Scania DI EPA Tier 2 diesels on ZF 550A gears. Among other refit items, the 10-ton hydraulic crane will be replaced with a 15-ton capacity crane with 70-ft reach.

A 80' x 28' two-pontoon (each consisting of double-stacked steel tubes) breakwater float is being fabricated for the Haisla First Nations village of Kitamaat. In a matter of a few hours, two excavators reduced the 1907-built 99.7' (registered length) wood tug IVANHOE to rubble (photo above; Arrow was contracted to carry out the demolition), which was carted away to various landfills (see also *Editor's Desk* on page 4).

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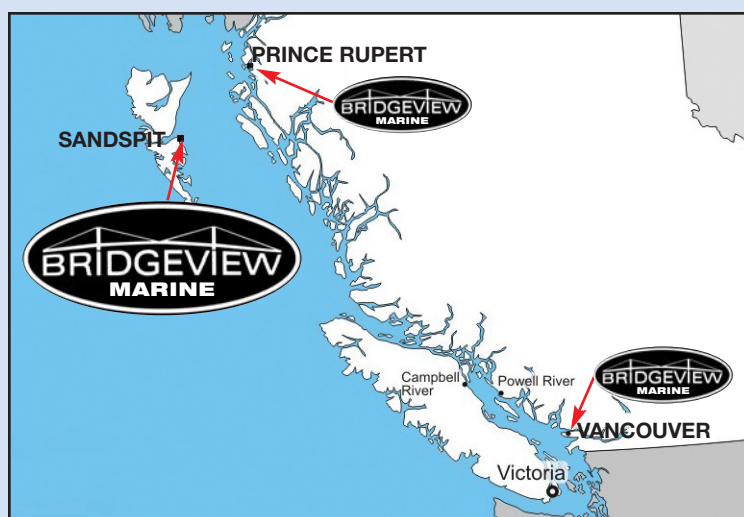
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Sedef Shipyard

Sedef Shipyard of Istanbul, Turkey has commenced its contract to build two 148.9m loa (145.2m lwl) x 26m x 4.25m (max draft) 6750 tonnes (maximum displacement) dual-fuel ro-ro ferries for Seaspans Ferries Corp (SFC; see also *Mariner's News* in *WM's* January 2015 issue). Designed by Vard Marine (Vancouver), the ferries will have capacity for up to 59 semi-trailers on the open vehicle deck. Expected to be in operation in late 2016, they will operate in Seaspans' drop trailer-only service between Tilbury Island on the Fraser River and Vancouver Island. Propulsion will be twin 4320kW Wartsila 9L34 diesels, Schottel SCD 4000 azimuthing thrusters and Wartsila LNGPac H200 (200m³ tank) LNG systems. The dual-fuel (DF) engines utilize diesel as the primary source of ignition and gas as a second fuel source for combustion, and offer the flexibility to run either on diesel only, or through a combination of diesel and natural gas. Maximum speed will be 16 knots. Corvus Energy will supply the two ferries with 1050VDC, 546kWh Energy Storage Systems (ESS) consisting of 84 Corvus Energy AT6500 advanced lithium polymer batteries. The ESS will be integrated with an Elkon Electrical propulsion and distribution system. The hybrid system will provide spinning reserve and power for responsive harbour manoeuvring. The Seaspans ferries will be the first dual-fuel energy storage hybrid ferries outside of Europe. Sedef Shipyard has built more than 175 vessels since its 1975 founding and is owned by Turkon Holdings, which provides marine transportation and shipbuilding services, along with marinas, hotels and other tourism ventures.

Kvichak Marine Industries

In February 2015 Kvichak delivered two sister aluminum 12-passenger vessels to West Coast Launch Ltd of Prince Rupert. The 39'11" x 13'6" x 2'4" LELU and KITSON are powered by twin 510-hp (@ 2250 rpm) Volvo Penta D11 diesels and ZF 305 1:1 marine gears on Hamilton 322 waterjets. With the

design load of 12 passengers and 1,000 kg of freight on the aft deck (the maximum freight loading for Transport Canada stability) the vessels have a top speed of 40 knots and a service/cruise speed of 30 knots.

West Coast Launch had the builder install a number of upgrades: larger fuel tanks (240 US gal capacity); an 800-lbs capacity davit for loading freight and deploying a man overboard retrieval sling; Volvo LED engine display screens; stern platform folding ladders for man-overboard retrieval; centreline main helm station; bus-type passenger seats; LED interior, deck and bow lights; removable handrails. As with the rest of West Coast's fleet, the KITSON and LELU will perform a variety of work, including: transport of marine pilots and shipping agents to and from ships; medivacs; crew transport to job sites; charter ferry services for the First Nations villages; school boat service. They will also provide passenger carriage support for the whale/grizzly bear tours run by West Coast Launch's Prince Rupert Adventure Tours. *Western Mariner* will run a feature on the LELU and KITSON in a future issue.

Tom-Mac Shipyard

Three big wood vessel restoration projects were ongoing at the beginning of March '15. The ex halibut boat CAPE BEALE (built in 1925 by John Berg and Edgar Arnet in a rented boatyard on False Creek, Vancouver) was acquired by logger Gordon Gibson Sr. in 1979 and an aft houseworks/ accommodation was installed for cruising the coast. His son, Gordon Gibson Jr, has been owner since about 1986. While planking replacements and refastening/recaulking have kept the hull in good condition, the internal structure has not fared as well. From the aft engine room bulkhead to the stern, stringers and bulkheads were so rotten they had to be shoveled out. Severely rusted steel punchings had to be jackhammered out of the bilges. Left with a wide open 'canoe'-like aft hull, the T-M managers and shipwrights have been challenged to figure out how to completely rebuild inside the hull, from under the aft deckhouse back to the timbered stern, by tying into still sound structure far-



IN THE SHIPYARDS

PHOTOS COURTESY TOM-MAC SHIPYARD



ther forward, with the CAPE BEALE remaining afloat for most of the project. Aluminum, wood, steel and UHMW plastic are all being used to renew the structures. Bulkheads were replaced with steel and the horn timber was steel-cased. Aluminum deck beams and shelves were being installed and tied into the aluminum side cladding (photo above left). The already aluminum-covered foredeck will be extended aft to form new side-decks and aft deck. Definitely a work in progress.

Twenty-plus new fir planks were installed in the tug SEA COASTER (Paul McLennan and Les Nielsen are at it in the



photo above right), this after rebuilding of the stem and the horn timber with purpleheart sections, and the reinforcing of the latter with steel plate. The Second family seiner CAPE BALL (launched in 1926 by Hoffar Marine Construction, Vancouver) got a few new planks and a 100 percent entire hull recaulking. Aluminum bulwark will be installed from midships up to the bow, port and starboard. On the steel tug repair side, the SEA IMP X had shaft work, engine alignments and fender work and the HODDER STAR had a parted steering nozzle reflanged and re-mounted.

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Independent Shipwrights

Under construction at Independent's Coombs BC shop is a new 60' x 23' all-fibreglass fishing vessel for Moondancer Fishing Co. (above left). The mold used is for a 17-ft beam so the hull halves it yielded were set up on a six-foot wide keel section to make up the 23-ft beam. The photo shows the bow bulb being finished off. The keel will receive a 10" x 1" steel shoe for protection and ballast, adding to the internal concrete and rail-



road track installed inside the keel. Independent will do all the machinery installations, including a 600-hp diesel of yet-to-be-determined manufacture. The deckhouse is being fabricated separately. The vessel will fish black cod, tuna, prawns and groundfish. At Ocean Pacific Boatyard (Campbell River), Independent was working on the ROYAL LANCER (above right), Silverado Fishing's prawn and tuna vessel which was widened and lengthened to 48' x 22' in the Coombs shop two years ago. Fibreglass work for the freezer plates, insulation, live tanks installation and plumbing, as well as hydraulics and electrical installations, were being completed.

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IN THE SHIPYARDS

PHOTOS COURTESY ABD BOATS



ABD Boats

At the beginning of March '15 the steel work was 90 percent complete on hull #372, the 71'2" x 35'0" x 13'0" 180 gt A.G. McIlwain Ltd-designed shipdocking tug for SMIT Marine Canada's operations in Burrard Inlet and/or the Fraser River. Separate fabrication of the aluminum wheelhouse was starting. The twin 2,685-bhp MTU16V4000 M61 main engines and the John Deere 4045 40-kW gensets are installed and mechanical work was ongoing with electrical wiring and breaker panels getting under way, as was the line-up between the mains and the transmissions for the Rolls-Royce US 205 FP Z-drive thrusters.

The thrusters will be installed (as will the wheelhouse) when the tug is moved out of the building shed prior to its launching which is projected to be in August 2015.

Ocean Pacific Boatyard

The Campbell River yard is the prime contractor for the construction of two towable fender barges (TFB) for Department of National Defence submarines. The TFBs will be deployed at the Royal Canadian Navy base at Esquimalt BC which is home port for the Victoria-class submarine fleet. Ocean Pacific built



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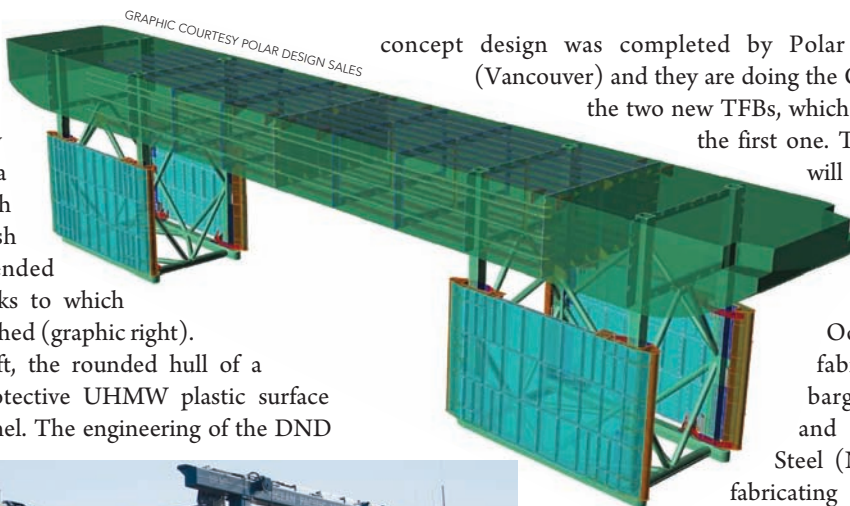
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the first TFB for the Navy in 2012 (photo below; see 2012 *Launches & Refits Annual* in WM's February 2013 issue). It consisted of a 100' x 14' steel barge with raked bow and stern, flush deck and two steel suspended under-water steel frameworks to which steel fender panels were attached (graphic right). With a panels draft of 17 ft, the rounded hull of a moored sub contacts a protective UHMW plastic surface about half way down the panel. The engineering of the DND



concept design was completed by Polar Design Sales (Vancouver) and they are doing the CAD lofting for the two new TFBs, which are larger than the first one. The new barges will measure 120' x 19'4" and the panels will have a draft of 18'3". Ocean Pacific is fabricating the barge mid-bodies and WaterBridge Steel (Nakusp BC) is fabricating the rake ends.

As they did for the first TFB, MacTavish Welding (Campbell River BC) is building the under-water frameworks and panels. Custom Plate & Profiles (Delta BC) is supplying the pre-formed and CAD-cut steel components. Ocean Pacific will complete the TFBs' assembly. The boatyard has erected a 60' x 80' frame/fabrication shed for the project and has also purchased a 30-ton TraveLift from the Port of Edmonds in Washington State, which will be used to move TFB components. ◀

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CALENDAR

APRIL

8-10, Mari-Tech 2015, Hyatt Regency Hotel, Vancouver BC. The Canadian Institute of Marine Engineering's premier annual conference and trade show returns to the west coast. *Mari-Tech 2015: Changing Tides – the Pacific Northwest* will feature three days of presentations on a range of topics and issues affecting western ports, transport and marine shipping. Sponsorship and exhibition information, and early registration available at www.mari-tech.org

14-16, WorkBoat Maintenance & Repair Conference and Expo, Morial Convention Center, Hall J, New Orleans LA USA. Geared towards the repair and maintenance sector, sponsored by Diversified Business Communications. www.workboatmaintenanceandrepair.com

REGULAR MONTHLY MEETINGS

Ancient Mariners, Lower Mainland: 3rd Wed., 11:30 a.m. Walnut Grove Pub & Bistro, Langley. www.ancientmarinersofbc.com; **Okanagan:** 3rd Thu, 11:00 a.m., Shades on Main, 1909 Main St, Penticton. **Vancouver Island (Chemainus):** 1st Tue, 11:30 a.m., Horseshoe Inn, Chemainus, Jim Goodwin 250-758-6727. **Vancouver Island (French Creek):** last Mon, 11:30 a.m., French Creek Marine Pub, French Creek. Call Earl Emery 250-752-8145. www.ancientmarinersofbc.com

Canadian Institute of Marine Engineering, Vancouver Branch, 3rd Wed (except Jul, Aug), 6:00 p.m., new location to be announced in November, visit www.cimarevanancouver.ca Reservations call Bob Brown 604-684-2491 sales@burrardironworks.com

Canadian Institute of Marine Engineering, Vancouver Island Branch, 3rd Thu, 7:00 p.m., Lower Lounge, CFB Esquimalt Ward Room, 1586 Esquimalt Rd, Victoria. Mike Weaver michaelweaver@shaw.ca

Canadian Merchant Service Guild Pioneers Association, Vancouver Chapter: 2nd Tue, Chainlocker, 218 Blue Mountain St, Coquitlam. **Victoria Chapter:** 3rd Sat, 10:00 a.m., Oak Bay Rec Centre Lounge, 1975 Bee St, Victoria. Hugh Doherty 250-595-0910 dirk@hdoherty.ca

C.P. Coasters, Nanaimo: 1st Mon, Charlie's, 123 Commercial Street, Nanaimo. **Vancouver:** 3rd Tue, Bonsar Centre, MetroTown, Burnaby. **Victoria:** 1st Sat, Oak Bay Recreation Centre, 1975 Bee St, Victoria 10:00-noon.

Society of Port Engineers of Puget Sound: 2nd Tue, 5:30 p.m., Rock Salt Restaurant, Westlake Ave, Seattle WA. www.sope-ps.org

Thermopylae Club: 2nd Wed, Maritime Museum of BC, Victoria, Jamie Webb 250-477-2295.

Underwater Archaeological Society of BC, Vancouver: last Wed (except Jul & Dec), Vancouver Maritime Museum, David Stone 604-980-0354. **Victoria:** 2nd Wed, Maritime Museum of BC, Victoria, Jacques Marc 250-474-5797.

Vancouver Wooden Boat Society: 2nd Wed, Britannia Heritage Shipyard, 5180 Westwater Dr, Richmond. 604-519-7400 www.vancouverwoodenboat.com

Victoria Esquimalt Harbour Society: 3rd Thur, Barry Hobbs 250-708-0201 or Jim Allard 604-944-2556.

World Ship Society: 2nd Wed, Sep-May, 7:30 p.m., Vancouver Maritime Museum, Glenn Smith 604-684-1240 glenn.smith@worldshipsocietyvan.ca

14-16, Ocean Business 15, National Oceanography Centre, Southampton UK. Ocean technology exhibition incorporating live demonstrations and hands-on training sessions. www.oceanbusiness.com

MAY

28-30, 21st CMC Towboat Industry Conference, Delta Victoria Ocean Pointe Resort & Spa. Biannual conference presented by the Council of Marine Carriers. www.comc.cc

JUNE

1-3, Aquaculture Canada 2015, Island Conference Centre, Nanaimo BC. Theme: "Blue Revolution 2.0" www.aquacultureassociation.ca

9-13, Offshore Mariculture Conference, Ensenada, Baja California, Mexico. www.offshoremariculture.com/mexico

AUGUST

TBA, 12th Richmond Maritime Festival, Britannia Heritage Shipyard, Steveston BC. Celebrate Richmond's traditional connections with the sea at this family event at Britannia Shipyard National Historic Site. The whole family can enjoy live entertainment (sea songs and shanties) see a variety of maritime exhibits, and participate in hands-on demonstrations of knot tying, rope making, model boat building, and net mending. Tour a floating exhibition of historic boats at the Shipyard docks, including the famed tug SS MASTER. Presented by Port Metro Vancouver. All events are free. www.richmondmaritimefestival.ca ◀

DECK WATCH, QUIZ 124

The Answers...

WM readers not familiar with the B.C. coast, give yourselves 100 percent - you were clearly at a disadvantage this month!

On a computer type in CHS Tide Tables - and you can access daily predictions in feet. Also, you don't need to add or subtract differences for many Secondary Ports - CHS has already done this.

1. Deep Cove is referenced on Vancouver
2. Gibsons is referenced on Point Atkinson
3. Maple Bay is referenced on Fulford Harbour
4. Esquimalt is referenced on Victoria
5. Justkatla is referenced on Bella Bella
6. Masset is referenced on Bella Bella
7. Bute Inlet is referenced on Port Atkinson
8. Point No Point is referenced on Sooke
9. Bellingham is referenced on Fulford Harbour
10. Comox is referenced on Point Atkinson

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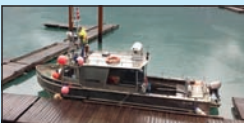
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| April 27 - 30 | MED A3 | Marine Emergency Duties - A3 | \$385.00 |
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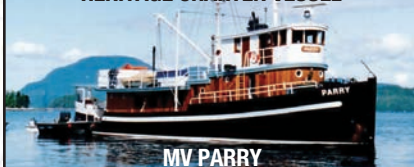
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